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DRAFTING
AND
REPRODUCTION
EQUIPMENT AND MATERIALS
SLIDE RULES

41st Edition

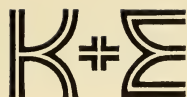
Part 1

KEUFFEL & ESSER CO.

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41st EDITION

CATALOG

PART 1

COVERING

**DRAFTING AND REPRODUCTION
EQUIPMENT AND MATERIALS.
SLIDE RULES**

KEUFFEL & ESSER CO.

ESTABLISHED 1867

*DRAFTING, REPRODUCTION, SURVEYING
EQUIPMENT AND MATERIALS
SLIDE RULES MEASURING TAPES*

General Office and Factories, **HOBOKEN, N. J.**

60 E. 42nd St.

CHICAGO

516-20 S. Dearborn St.

SAN FRANCISCO

30-34 Second St.

NEW YORK

127 Fulton St.

ST. LOUIS

817 Locust St.

LOS ANGELES

1327 S. Olive St.,

24-24 Jackson Ave., L. I. City

DETROIT

General Motors Building.

MONTREAL


7-9 Notre Dame St., W.

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1909, 1912, 1915, 1921, 1927, 1936, 1943, 1944, 1949 by

KEUFFEL & ESSER CO.

Printed in U. S. A.



KEUFFEL & ESSER CO., NEW YORK

October, 1949

THE 41st EDITION

Part 1

In this 41st Edition the K & E Catalog is being published in two parts.

Part 1 contains the K & E line of Drafting and Reproduction equipment and materials and includes K & E Slide Rules.

Part 2, which will follow shortly, will cover the K & E line of Surveying Instruments and Equipment, Engineers' Field Books and Measuring Tapes.

KEUFFEL & ESSER CO.



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KEUFFEL & ESSER CO., NEW YORK

K & E SALES AND SERVICES

K & E products and services are available through K & E Branches and Distributors at convenient points throughout the United States and Canada.

In addition to the General Office and Factories at Hoboken, N. J., K & E maintain three establishments in the metropolitan area of New York. Other K & E Branches are in Detroit, Chicago, St. Louis, San Francisco, Los Angeles, and Montreal.

These K & E Branches carry the full K & E line of Drafting, Reproduction and Surveying Equipment and Materials, Slide Rules and Measuring Tapes. In addition, they offer a full range of highest quality reproduction services. The Branches are staffed with factory-trained representatives and repair experts, who are always at your service.

If we can help in any way, in suggesting the source of supply for K & E products and services most convenient to you, we suggest that you write Keuffel & Esser Co. Hoboken, N. J.


 KEUFFEL & ESSER CO., NEW YORK

NOTICE

This 41st edition of our Catalog supersedes all previous editions.

The prices in the supplemental price lists published from time to time, are Net Cash in New York, Chicago, St. Louis, Detroit, and are subject to change without notice. For our branches in San Francisco, Cal., Los Angeles, Cal. and Montreal, Canada, separate price lists are issued.

In ordering from this Catalog, it is necessary to give the number, and in some cases the sub-number, size, color, etc., of the article desired.

Remittances can be made either by bank-draft, payable to our order; by Cash sent through any of the Express Companies; or by Post-Office or Express Money Order. If cash is sent by mail, the letter should be registered.

Remittances in all cases are at the risk of the sender.

For special goods to be made to order and not listed by us, payment is invariably required when the order is placed.


Where goods are ordered to be sent by express, C. O. D., express charges for collection will be added to the amount of the bill. By sending full remittance with the order, buyers will save the charges for collecting the amount of the bill, and will avoid delay in delivery.

For parcel post shipments, postage at the established rates must be added to the price of goods so ordered. Shipments are insured at the following rates, effective January 1, 1949.

C. O. D. CHARGES				INSURANCE CHARGES			
Including Insurance							
Amount of Insurance			Fee	Amount of Insurance			Fee
From \$.01 to \$ 2.50	.	20	cents	From \$.01 to \$ 5.00	.	05	cents
" \$ 2.51 to \$ 5.00	.	25	"	" \$ 5.01 to \$ 10.00	.	10	"
" \$ 5.01 to \$ 25.00	.	35	"	" \$ 10.01 to \$ 25.00	.	15	"
" \$ 25.01 to \$ 50.00	.	45	"	" \$ 25.01 to \$ 50.00	.	20	"
" \$ 50.01 to \$ 100.00	.	55	"	" \$ 50.01 to \$ 100.00	.	25	"
" \$ 100.01 to \$ 150.00	.	60	"	" \$ 100.01 to \$ 200.00	.	30	"
" \$ 150.01 to \$ 200.00	.	65	"				

The amount collected from the addressee includes the fee for the post-office money order by means of which remittance is made.

As every precaution is used in packing goods, no allowance can be made if goods be damaged in direct shipment or enclosure through other houses.



KEUFFEL & ESSER CO., NEW YORK

IMPORTANT NOTICE REGARDING OWNERSHIP OF GOODS IN TRANSIT

In order that there may be no misunderstanding relative to the ownership of goods which are in transit between buyer and seller, the following points are called to attention:

When goods are sold f. o. b. shipping point the title passes to the consignee. The consignor's responsibility for delivery or damage ceases as soon as he obtains a receipt from the Transportation Company. Responsibility for their non-delivery rests with the Transportation Companies. The goods, therefore, must be paid for in accordance with agreed terms, even though they have not reached their destination.

Claims against the Transportation Companies must be made **by the consignee**. When requested we will furnish the necessary documents for making these claims. The Express Companies limit to **nine months**, the Freight Companies to **nine months**, and Parcel Post to **six months**, the period within which claims must be made. This period **dates from date of shipment**. The fact that notice has been given to the Transportation Company that the goods have not been delivered, and that a request has been made to trace them, does not serve to extend the period within which claims for damages or loss may be made.

DRAWING PAPERS

The drawing papers listed in the following pages are of American manufacture. They constitute a complete assortment of the drawing papers which have been found to be most useful in professional, industrial, and collegiate drafting practice.

The most important characteristics of each paper are accurately described together with suggested uses.

Outside the laboratory, there are few testing methods by which paper qualities can be accurately compared. A paper may exhibit obvious advantages in one direction, while in another direction a serious shortcoming escapes notice. Selecting papers of the proper *combination* of desirable properties becomes a matter of the most careful judgment based not only on elaborate tests, but also on long experience.

Under these conditions the thoughtful buyer may well place his confidence with a house such as **Keuffel & Esser Co.** whose integrity and judgment are well established as a result of 82 years of successful service to customers.

If further information or advice in making selections is required, inquiries will receive prompt and careful attention.

KEUFFEL & ESSER CO., NEW YORK

WHITE DRAWING PAPERS

GRIFFIN

TRADE MARK

WATER - RESISTANT

- STOCK** —100% highest grade new white rag.
- SURFACE** —Very smooth; water resistant; may be cleaned with a moistened cloth.
- ERASING QUALITY** —Excellent; ink lines may be drawn over repeated erasures.
- STRENGTH** —Very good; resists kinking and tearing and can be folded repeatedly without breaking.
- PERMANENCE** —Excellent; will not discolor or weaken with age.
- USES** —The smooth hard surface, excellent ink-taking, pencil-taking, and erasing qualities in combination with its unique water resisting property make this paper especially suitable for rigorous requirements of many kinds. Complicated engineering layouts, maps, plots or any project requiring long continued work on the drawing board benefit by its use. It is recommended for outdoor work such as plane table drawing; for plats to be used in wet mines. Mounted on muslin it is ideal for city engineers' reference plots. See pages 20 to 22 for description of mounted drawing papers.

GRIFFIN Water Resistant. Thickness approx. .011 in.

24H. SHEETS Any size to order.

24H. ROLLS 10 yards long and in the following widths:
36 in. 42 in.

24HP. ROLLS Of about 50 lbs.; sold by the pound in the following widths:
36 in. 42 in.

KEUFFEL & ESSER CO., NEW YORK

WHITE DRAWING PAPERS

(CONTINUED)

GRIFFIN

TRADE MARK

- STOCK** —100% highest grade new white rag.
- SURFACE** —GRIFFIN Medium—smooth; for ink or pencil
—GRIFFIN Heavy—fairly smooth; for ink, pencil or water color.
- ERASING QUALITY**—Very good; ink will not spread on erased areas.
- STRENGTH** —Very good; does not kink or tear easily and can be folded repeatedly without breaking.
- PERMANENCE** —Excellent; will not discolor or weaken with age.
- USES** —GRIFFIN, being a drawing paper of highest quality, is suitable for practically any kind of drawing. It is the logical selection for work requiring careful and accurate execution, even over erasures. It is used for intricate mechanical drawings, maps, architectural drawings, advertising layouts, art work, etc.

GRIFFIN MEDIUM—Smooth. Thickness approx. .009 in.

- 25. SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
19 × 24 in. 22 × 30 in. 24 × 36 in. 27 × 40 in.
- 25. ROLLS** 10 yards long and in the following widths:
36 in. 42 in. 62 in.
- 25P. ROLLS** Of about 50 pounds, sold by the pound in the following widths:
36 in. 42 in. 62 in.

GRIFFIN HEAVY—Fairly Smooth. Thickness approx. .011 in.

- 25H. SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
19 × 24 in. 22 × 30 in.
- 25H. ROLLS** 10 yards long and in the following widths:
36 in. 42 in. 62 in.
- 25HP. ROLLS** Of about 50 pounds, sold by the pound in the following widths:
36 in. 42 in. 62 in.



WHITE DRAWING PAPERS

(CONTINUED)

HAWK

TRADE MARK

- STOCK** —High percentage of high grade rag.
- SURFACE** —HAWK Heavy—smooth; for ink or pencil.
HAWK Medium—fairly smooth; for ink, pencil or water color.
- ERASING QUALITY** —Good; ink does not spread over erased areas.
- STRENGTH** —Good; not easily torn, will not readily break where folded.
- PERMANENCE** —Very good.
- USES** —HAWK is an excellent general purpose white drawing paper. Though not quite as tough as No. 25, it serves for many uses equally well. It is used extensively in high grade school drawing and art work.

HAWK HEAVY—Smooth; thickness approx. .010 in.

- N27. SHEETS** Sold by the quire (24 sheets) or ream (480 sheets) in any size to order; stocked in the following sizes:
 19×24 in. 22×30 in. 24×36 in. 27×40 in.
- N27. ROLLS** 10 yards long and in the following widths:
36 in. 42 in.
- N27P. ROLLS** Of about 50 pounds, sold by the pound in the following widths:
36 in. 42 in.

HAWK MEDIUM—Fairly smooth; thickness approx. .008 in.

- N28. SHEETS** Sold by the quire (24 sheets) or ream (480 sheets) in any size to order; stocked in the following sizes:
 19×24 in. 22×30 in. 24×36 in. 27×40 in.
- N28. ROLLS** 10 yards long and in the following widths:
36 in. 42 in. 62 in.
- N28P. ROLLS** Of about 50 pounds, sold by the pound in the following widths:
36 in. 42 in. 62 in.

KEUFFEL & ESSER CO., NEW YORK

WHITE DRAWING PAPERS (CONTINUED)

PARCHMINE

TRADE MARK

- STOCK** —100% rag. Each roll watermarked "PARCHMINE 100% RAG."
- SURFACE** —Smooth, hard sized. Suitable for pencil or ink line drawings.
- ERASING QUALITY**—Fairly good.
- STRENGTH** —Will withstand almost any amount of folding and rough handling.
- PERMANENCE** —Very good.
- USES** —PARCHMINE fills the demand for a high grade white drawing paper which is not bulky when filed, and yet is strong enough to withstand rough treatment. Although it is not designed as a tracing paper, blueprints can be made from PARCHMINE Thin.

PARCHMINE MEDIUM—Smooth. Thickness approx. .0045 in.

- 35. ROLLS** 20 yards long and in the following widths:
30 in. 36 in. 42 in. 54 in.

PARCHMINE THIN—Smooth. Thickness approx. .003 in.

- 35T. ROLLS** 20 yards long and in the following widths:
36 in. 42 in.

K & E LEDGER


- STOCK** —100% high grade rag.
- SURFACE** —Very smooth. Suitable for ink or pencil work.
- ERASING QUALITY**—Very good.
- STRENGTH** —Very good, resists tearing, and can be folded freely.
- PERMANENCE** —Will not discolor or deteriorate with age.
- USES** —Ledger papers are used for legal documents, and other kinds of permanent records, as well as for general drawing. The very smooth surface is suitable for very fine work.

K & E LEDGER HEAVY—Smooth. Thickness approx. .0055 in.

- 38. SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in smaller sizes to order; stocked in the following sizes:
17 × 22 in. 24 × 36 in.

K & E LEDGER MEDIUM—Smooth. Thickness approx. .0036 in.

- 38L. SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in smaller sizes to order; stocked in the following size:
24 × 36 in.


 KEUFFEL & ESSER CO., NEW YORK

WHITE DRAWING PAPERS

(CONTINUED)

REYNOLDS'S BRISTOL BOARD

REYNOLDS'S BRISTOL BOARD—White, smooth surface.

- 42-2. 2-ply, plain (not printed), sold by gross or dozen in the following sizes:
 Trade Mark 8x13 in. Patent Office 10x15 in.
- 42-3. 3-ply, plain (not printed), sold by gross or dozen in the following size:
 Patent Office 10x15 in.

STRATHMORE PATENT OFFICE BOARD

Strathmore Patent Office Board is a high grade smooth, hard surfaced Bristol Board. The thickness of the 2-ply board is about .0075 inches and of the 3-ply about .0125 inches. Each sheet 10x15 in. is stamped "Strathmore Patent Office".

These boards are of the type specified by the U. S. Patent Office for trade-mark and patent drawings. The 3-ply sheets are most satisfactory for this purpose.

STRATHMORE PATENT OFFICE BOARD—White, smooth surface.

- 43-2. 2-ply, plain (not printed), sold by the gross or dozen in the following sizes:
 P. O. 10 × 15 15 × 20 20 × 30 in.
- 43-3. 3-ply, plain (not printed), sold by the gross or dozen in the following sizes:
 P. O. 10 × 15 15 × 20 20 × 30 in.



Sheets printed with border and title as required by U. S. Patent Office.

- 43PL. 2-ply, P. O. 10 × 15 in., printed, sold by the gross or dozen.
- 43P. 3-ply, P. O. 10 × 15 in., printed, sold by the gross or dozen.



COLORED DRAWING PAPERS

CONDOR — CREAM

TRADE MARK

- STOCK** —100% rag.
- SURFACE** —Fairly smooth; takes ink and pencil.
- ERASING QUALITY** —Very good. Ink does not spread on erased areas.
- STRENGTH** —Very good; will not tear easily or break where folded.
- PERMANENCE** —Very good; will not weaken or discolor and will stand much abuse.
- USES** —Due to its strength, erasing quality, and its soft color, CONDOR is the logical selection for general engineering layout and detail work. Schools and colleges find it a practical drawing and sketching paper. It is also suitable for shop drawings, as it will withstand a great amount of rough handling.

CONDOR MEDIUM—Cream. Thickness approx. .008 in.

- 53.** **SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
 17 × 22 in. 19 × 24 in. 22 × 30 in. 24 × 36 in. 27 × 40 in
- 53.** **ROLLS** 10 yards long and in the following widths:
 30 in. 36 in. 42 in. 62 in.
- 53X.** **ROLLS** 50 yards long and in the following widths:
 30 in. 36 in. 42 in. 62 in.
- 53P.** **ROLLS** Of about 50 pounds, sold by the pound in the following widths:
 30 in. 36 in. 42 in. 62 in.

CONDOR HEAVY—Cream. Thickness approx. .009 in.

- 53H.** **SHEETS** Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
 22 × 30 in. 24 × 36 in. 27 × 40 in.
- 53H.** **ROLLS** 10 yards long and in the following widths:
 36 in. 42 in. 62 in.
- 53HX.** **ROLLS** 50 yards long and in the following widths:
 36 in. 42 in. 62 in.
- 53HP.** **ROLLS** Of about 50 pounds, sold by the pound in the following widths:
 36 in. 42 in. 62 in.



COLORED DRAWING PAPERS (CONTINUED)

CONDOR — GREEN TRADE MARK

CONDOR MEDIUM —Green. Thickness approx. .008 in.

Except for its green color, this paper is like No. 53. The light green hue is pleasing and restful to the eye, provides good contrast, and does not soil easily.

- | | | |
|------|--------|---|
| 54. | SHEETS | Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
17×22 in. 19×24 in. 22×30 in. 24×36 in. 27×40 in. |
| 54. | ROLLS | 10 yards long and in the following widths:
30 in. 36 in. 42 in. |
| 54X. | ROLLS | 50 yards long and in the following widths:
30 in. 36 in. 42 in. |
| 54P. | ROLLS | Of about 50 pounds, sold by the pound in the following widths:
30 in. 36 in. 42 in. |

HAWK — CREAM TRADE MARK

- | | |
|-----------------|--|
| STOCK | —High percentage of rag. |
| SURFACE | —Finely grained; for pencil or ink. |
| ERASING QUALITY | —Good. |
| STRENGTH | —Good: not easily torn or broken where folded. |
| PERMANENCE | —Good. |
| USES | —An excellent detail paper of moderate price. Used extensively for school drafting work. |

HAWK Cream—Thickness approx. .0085 in.

- | | | |
|------|--------|--|
| 57. | SHEETS | Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes:
19 × 24 in. 22 × 30 in. 24 × 36 in. 27 × 40 in. |
| 57. | ROLLS | 10 yards long and in the following widths:
30 in. 36 in. 42 in. |
| 57X. | ROLLS | 50 yards long and in the following widths:
30 in. 36 in. 42 in. |
| 57P. | ROLLS | Of about 50 pounds, sold by the pound in the following widths:
30 in. 36 in. 42 in. |



BUFF DETAIL PAPERS

SIMPLEX

REG. U. S. PAT. OFF.

STOCK	—High grade sulphite, free from ground wood.
SURFACE	—Finely grained; primarily a pencil paper; ink can be used.
STRENGTH	—Very good.
PERMANENCE	—Fair.
USES	—SIMPLEX is a satisfactory paper for drawings of temporary value.

SIMPLEX MEDIUM. Thickness approx. .0075 in.

58.	SHEETS	Sold by the quire (24 sheets) or the ream (480 sheets) in any size to order; stocked in the following sizes: 22 × 30 in. 24 × 36 in.
58.	ROLLS	10 yards long and in the following widths: 30 in. 36 in. 42 in. 48 in. 54 in.
58X	ROLLS	50 yards long and in the following widths: 30 in. 36 in. 42 in. 48 in. 54 in.
58P.	ROLLS	Of about 50 pounds, sold by the pound in the following widths: 30 in. 36 in. 42 in. 48 in. 54 in.



MANILA PAPER

- SURFACE** —Smooth; highly calendered.
- STRENGTH** —Extremely tough; will withstand abuse remarkably well.
- USES** —Manila Paper is not a drawing paper, though sometimes so used. It makes excellent stencils and templates due to its toughness and stiffness; cut edges are not easily eroded or distorted. Manila is also used as a drafting table cover, for paper files, folders, etc.

MANILA MEDIUM. Thickness approx. .0105 in.

- | | | | | | |
|---------------|--------------|---|--------|--------|--------|
| 64-1X. | ROLLS | 50 yards long and in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. |
| 64-1P. | ROLLS | Of about 100 lbs., sold by the pound in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. |

MANILA HEAVY. Thickness approx. .013 in.

- | | | | | | |
|---------------|--------------|---|--------|--------|--------|
| 64-2X. | ROLLS | 50 yards long and in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. |
| 64-2P. | ROLLS | Of about 100 lbs., sold by the pound in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. |

MANILA EXTRA HEAVY. Thickness approx. .016 in.

- | | | | | | |
|---------------|--------------|---|--------|--------|--------|
| 64-3X. | ROLLS | 50 yards long and in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. |
| 64-3P. | ROLLS | Of about 100 lbs., sold by the pound in the following widths: | | | |
| | | | 36 in. | 40 in. | 48 in. | 54 in. |
-

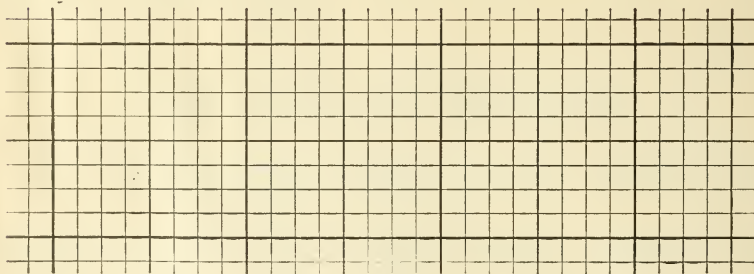
TRADE MARK

This new product fills a long-felt drafting room need. It offers just the right board covering on which to make clean-cut drawings. When tracing paper or cloth is fastened directly on the board or over ordinary paper, lines are apt to be irregular or wavy and erasure ghosts caused by pencil scars are almost inevitable. Moreover, the board or under-paper quickly discolors due to ground-in dirt and the unsightly darkened surface cannot easily be cleaned.

Laminene ideally overcomes these objections. Its surface is glass-smooth with no irregularities to deflect the pencil; it is hard enough to minimize pencil scoring, yet yielding enough for the pencil line to take well. The surface is washable and may be kept clean by an occasional sponging. Ink stains wash off easily. Furnished in white or green.

70W.	ROLLS	20 yards long and in the following widths;
		36 in. 42 in.

706. ROLLS 20 yards long and in the following widths:
36 in. 42 in.



No. 71.

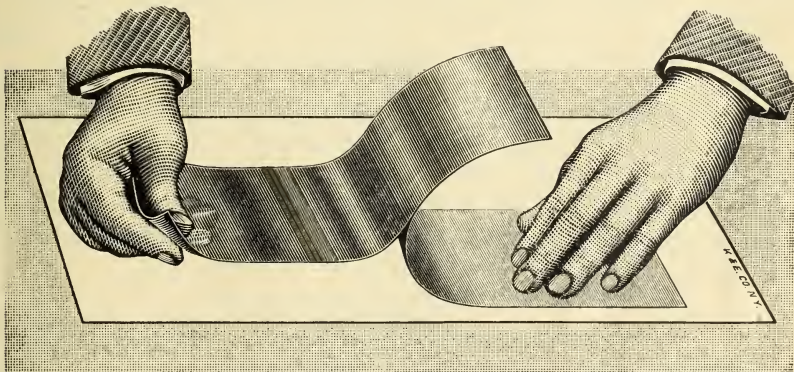
This drawing board surface material has the features described above and in addition the section lines, being visible through a tracing, provide a continuous two-way scale under the tracing which serves as a convenient guide in laying out the drawing, plotting curves, checking lengths etc. Sections are 8x8 to the inch, 4th lines accented.

71. ROLLS 20 yards long, 32 inches wide; width of section engraving 30 inches.

DULSEAL

TRADE MARK

DULSEAL adheres very well to glass, metal, plastics, untreated papers and cloths. It does not adhere well to waxy or oily surfaces nor to photographic paper, cloth or film which carries a gelatine base emulsion.



74. SHEETS Any size to order up to 24 in. wide.

CLEARSEAL

TRADE MARK

75. SHEETS Any size to order up to 24 in. wide.



MOUNTED DRAWING PAPERS

High grade papers mounted on heavy muslin are excellent for drawings, charts, and maps which must be kept for permanent reference and are subject to frequent handling or alteration. They are equally valuable for art work.

USES

By combining the natural strength of the paper, muslin and binder, an assembly is produced which is flexible yet stiff enough to lie flat, and strong enough to resist successfully all ordinary bending or tearing strains. Muslin mounted drawings of city or county plots, mine shafts, real estate subdivisions, building floor plans, statistical graphs, triangulation net works etc. have been used for years without serious depreciation. In such use, the cost of the paper is negligible in comparison to its utility value.

PROCESS

All of our papers are muslin-mounted in our factory by the special K & E process which assures maximum strength, durability, and utility. Only high grade tested heavy muslin is used. The specially prepared adhesive provides both a filler and a permanent bond, and the air drying under tension leaves the assembly free from internal stresses and injury which may result from the hot-roll drying process used by some other makers.

MARKING

For the protection of our customers all single-mounted papers by K & E are so designated by a stamping on the muslin side, which indicates also the type of paper used.

SPECIAL MOUNTING

Some users require mounted sheets in which one or more of the edges of the sheets must have the muslin projecting beyond the paper. We are prepared to make up such sheets to order. A diagram should be included with order or inquiry giving dimensions of paper and borders.

LENGTH OF ROLLS

Standard roll length of mounted stock is 10 yards. Longer rolls up to 20 yards are available on special order at a slightly greater price per yard.



MOUNTED DRAWING PAPERS

GRIFFIN

TRADE MARK

GRIFFIN White Water Resistant Drawing Paper Mounted.

For description of paper, see page 9.

No. 24H. Mounted on Muslin.

124H. ROLLS 10 yards long; sold by the roll or yard in the following widths:
36 in. 42 in.

124H. SHEETS 18×24 in. 24×31 in.
Other sizes as ordered.

No. 24H. Double Mounted; paper on both sides of muslin.

124H-2. SHEETS 18×24 in. 24×31 in.
Other sizes as ordered.

No. 24H. Double Mounted; paper on both sides of muslin, with grain of two sheets at right angles.

124H-3. SHEETS 18×24 in. 24×31 in.
Other sizes as ordered.

GRIFFIN White Drawing Paper Mounted.

For description of paper, see page 10.

No. 25. Mounted on Muslin.

N125. ROLLS 10 yards long; sold by the roll or yard in the following widths:
36 in. 42 in. 62 in.

N125. SHEETS Sizes as ordered.

No. 25H. Mounted on Muslin.

N125H. ROLLS 10 yards long; sold by the roll or yard in the following widths
36 in. 42 in. 62 in.

N125H. SHEETS 22×30 in. 27×40 in.
Other sizes as ordered.

No. 25H. Double Mounted; paper on both sides of muslin.

N125H-2. SHEETS 22×30 in. 27×40 in.
Other sizes as ordered.



MOUNTED DRAWING PAPERS

(CONTINUED)

CONDOR

TRADE MARK

CONDOR Cream Drawing Paper Mounted.

No. 53 Mounted on Muslin. For description of paper, see page 14.

- | | | |
|------|--------|--|
| 143. | ROLLS | 10 yards long; sold by the roll or yard in the following widths: |
| | | 36 in. 42 in. 62 in. |
| 143. | SHEETS | 15×15 in. 18×18 in. 18×24 in. 22×22 in. 24×31 in. |
| | | Other sizes as ordered. |

CONDOR Cream Drawing Paper Double Mounted.

No. 53 Double Mounted; paper on both sides of muslin.

- | | | |
|--------|--------|---|
| 143-2. | SHEETS | 15×15 in. 18×18 in. 18×24 in. 22×22 in. 24×31 in. |
| | | Other sizes as ordered. |

CONDOR Green Drawing Paper Mounted.

No. 54 Mounted on Muslin. For description of paper, see page 15.

- | | | |
|-------|--------|---|
| 143G. | SHEETS | 15×15 in. 18×18 in. 18×24 in. 22×22 in. 24×31 in. |
| | | Other sizes as ordered. |

CONDOR Green Drawing Paper Double Mounted.

No. 54 Double Mounted; paper on both sides of muslin.

- | | | |
|---------|--------|---|
| 143G-2. | SHEETS | 15×15 in. 18×18 in. 18×24 in. 22×22 in. 24×31 in. |
| | | Other sizes as ordered. |

KEUFFEL & ESSER CO., NEW YORK

STABILENE

TRADE MARK

GLASS CLOTH

STABILENE Glass Cloth is a specially impregnated material woven from glass threads. Its outstanding characteristics are dimensional stability and transparency. These further facts are important:

1. Its co-efficient of expansion and any reaction to climatic conditions are practically nil.
2. It has flexibility and is light and compact to handle, store or ship.
3. It is permanent.
4. It is economical, in saving work, time, outlay for equipment, and production costs.

STABILENE Glass Cloth solves the hitherto complicated and costly problem of achieving dimensional stability in drawings and reproductions. The aircraft industry offers the outstanding example of the vital need for maintaining dimensional stability in the production of true-to-scale metal templates from true-to-scale engineering drawings on a dimensionally stable material. This is the process:

1. The original master drawing is made on **STABILENE** Glass Cloth in ink (on No. 144) or in pencil (on No. 147).
2. Reproductions are made by ordinary contact printing for:
 - (i) **Templates.** The original "master" on **STABILENE** is reproduced by contact printing on the template metal or other materials sensitized with special solutions (which will be supplied by K & E and are easy to apply). No special films or laminations are needed.
 - (ii) **Duplicate STABILENE "masters"** on No. 421 PHOTACT Glass Cloth (**STABILENE** base with chloride emulsion) or No. 520 HELIOS Glass Cloth (**STABILENE** base with HELIOS emulsion.)
 - (iii) **Ordinary working Prints** or other production materials, (made from **STABILENE** "masters" or duplicate "masters").

The advantages that **STABILENE** Glass Cloth offers for working throughout with full scale layouts and maintaining dimensional stability with great accuracy make this cloth of great value in the aircraft industry, in the automotive field and in the manufacture of machinery and products of all kinds. It is also important for mapping and plane table work, for Public Utilities, City Planning work and so on.

INK DRAWING SURFACE (one side).

144. SHEETS 12 ft. long, 36 and 48 inches wide.

PENCIL DRAWING SURFACE (one side).

147. SHEETS 12 ft. long, 36 and 48 inches wide.

Other sizes as ordered.



IMPRINTED SHEETS

TRACING CLOTH, PENCIL CLOTH,
DRAWING PAPER, TRACING PAPER

To save time, labor and expense in the drafting room, papers and tracing cloths may well be cut to size and imprinted with margins, titles etc. We have specialized on this work for years; know the exacting requirements, and are prepared to meet them. In making inquiries or placing orders, the use of the check list on the next page will help to facilitate our service.

					KEUFFEL & ESSER CO. NEW YORK DRAWING MATERIALS - MATHEMATICAL AND SURVEYING INSTRUMENTS - MEASURING TAPES	
REVISIONS NO. DESCRIPTION DW. CK.						
					DRAWN _____ DATE _____ CHECKED _____ SCALE _____ APPROVED _____	

Our service in supplying tracing cloth, tracing paper or drawing paper in sheets cut to size, and with printed borders, title blocks etc. to customer's specifications is commended for the following reasons:

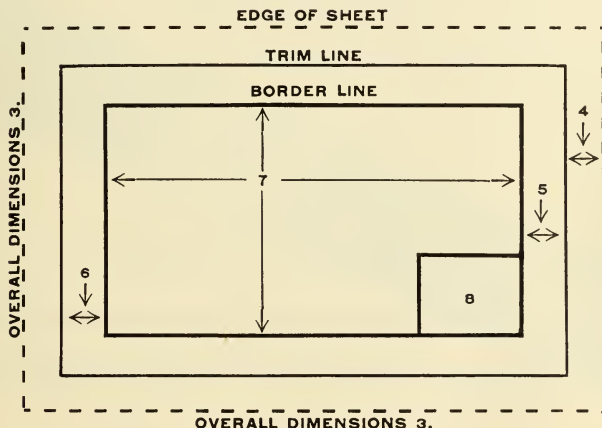
1. Special opaque indelible non-smudging ink is used which reproduces perfectly on blue-prints or other reproductions.
2. Our long experience in specializing in this class of work has familiarized us with the varied inking requirements of the different types of papers and cloths thus assuring satisfactory results.
3. From first inquiry to final delivery, K & E cooperative service assures prompt, intelligent and efficient handling.

KEUFFEL & ESSER CO., NEW YORK

IMPRINTED SHEETS

(CONTINUED)

TRACING CLOTH, PENCIL CLOTH, DRAWING PAPER, TRACING PAPER



To facilitate prompt service, the following check list will be helpful to assure supplying necessary information when ordering or making inquiries:

1. Number of sheets wanted.
2. K & E Catalog No. and/or name of sheet.
3. Overall dimensions of sheet.
4. Trimline distance from edges of sheet. Note:- Trimline may be eliminated if desired, but if included it must be at least $\frac{1}{2}$ in. from edge on all larger sizes, and $\frac{3}{8}$ in. on smaller sizes.
5. Border distance from trimline (or edge, if no trimline). Must be at least $\frac{1}{2}$ in. from edge of sheet on all larger sizes, and $\frac{3}{8}$ in. on smaller sizes.
6. Line thickness for (a) trimline, (b) border. See next page.
7. Dimensions of drawing inside border (overall dimensions less sum of borders.)
8. Title block specifications. Send sample, sketch, or detailed instructions using *spacing* and *type* numbers as indicated on next page. If other type styles are desired send samples.
9. Advise which side of cloth or paper is to be imprinted. Will be printed on working side unless otherwise ordered. If printed on non-working side, printing must be reversed, reading from right to left. We are prepared to do this.
10. Any other special requirements such as punching holes for filing will be given careful consideration.

Note:- Blue prints if used for samples should be *dimensioned*, since measurements on blue prints may vary from those of the tracing.



IMPRINTED SHEETS

(CONTINUED)

INFORMATION FOR ORDERING

LINE THICKNESS

In specifying line thickness, send sample or use the following numbers:—

- No. 1. _____
 No. 2. _____
 No. 3. _____
 No. 4. _____
 No. 5. _____
 No. 6. _____

TYPE

In specifying type sizes:

—use following reference numbers,
 or give printer's point sizes.

- | | | | | | |
|--------|---------------------|----------------|--------|---------------------|---------|
| No. 1 | KEUFFEL & ESSER CO. | HOBOKEN, N. J. | No. 11 | KEUFFEL & ESSER CO. | HOBOKEN |
| No. 2 | KEUFFEL & ESSER CO. | HOBOKEN | No. 12 | KEUFFEL & ESSER CO. | HOBOK |
| No. 3 | KEUFFEL & ESSER CO. | HOB | No. 13 | KEUFFEL & ESSER CO. | HO |
| No. 4 | KEUFFEL & ESSER CO. | HO | No. 14 | KEUFFEL & ESSER CO. | |
| No. 5 | KEUFFEL & ESSER CO. | | No. 15 | KEUFFEL & ESSER | |
| No. 6 | KEUFFEL & ESSER | | No. 16 | KEUFFEL & ESS | |
| No. 7 | KEUFFEL & ESS | | No. 17 | KEUFFEL & E | |
| No. 8 | KEUFFEL & E | | No. 18 | KEUFFEL & | |
| No. 9 | KEUFFEL & | | No. 19 | KEUFFEL | |
| No. 10 | KEUFFEL | | No. 20 | KEUFFE | |
| | | | No. 21 | KEUFF | |

KEUFFEL & ESSER CO., NEW YORK

TRACING CLOTHS



No. 156.

EXCELSIOR TRACING CLOTH

TRADE MARK

(for Ink Drawings)

- COLOR** —Blue tint.
- SURFACE** —One side dull, one side glazed.
- TRANSPARENCY**—Exceptionally high.
- USES** —Due to its great transparency, EXCELSIOR is especially valuable for tracing intricate fine-line drawings such as complicated machine assemblies, small scale maps, etc.

150. ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.

150. SHEETS Sizes as ordered; plain or imprinted.

IMPERIAL TRACING CLOTH

TRADE MARK

(for Ink Drawings)

- COLOR** —Blue tint.
- SURFACE** —One side dull, one side glazed.
- 156. ROLLS** 20 yards long and in the following widths;
24 in. 30 in. 36 in. 38 in. 42 in. 48 in. 54 in.
- 156. SHEETS** Sizes as ordered; plain or imprinted.



TRACING CLOTHS (CONTINUED)

IMPERIAL PENCIL TRACING CLOTH

TRADE MARK

(for Pencil and Ink Drawings)

- COLOR —Blue tint.
- SURFACE —N157, both sides dull finish, reverse side slightly smoother than working surface.
—N157½, one side dull, one side glazed.
- N157. ROLLS** 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- N157. SHEETS** Sizes as ordered; plain or imprinted.
- N157½. ROLLS** 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- N157½. SHEETS** Sizes as ordered; plain or imprinted.

ARKWRIGHT TRACING CLOTH

(for Ink Drawings)

- COLOR —Blue tint.
- SURFACE —One side dull, one side glazed.
- 158. ROLLS** 20 yards long and in the following widths:
24 in. 30 in. 36 in. 42 in.
- 158. SHEETS** Sizes as ordered; plain or imprinted.

ARKWRIGHT PENCIL TRACING CLOTH

(for Pencil or Ink Drawings)

- COLOR —Blue tint.
- SURFACE —Both sides dull finish, reverse side slightly smoother than working surface.
- 161. ROLLS** 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 161. SHEETS** Sizes as ordered; plain or imprinted.

MATSURF PENCIL TRACING CLOTH

(for Pencil or Ink Drawings)

- COLOR —Blue tint.
- SURFACE —One side dull, one side glazed
- N162. ROLLS** 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- N162. SHEETS** Sizes as ordered; plain or imprinted.



TRACING CLOTHS (CONTINUED)

PHOENIX

REG. U. S. PAT. OFF.

(for Pencil and Ink Drawings)

- STOCK** — A high grade closely woven cloth, specially treated by K & E by a process developed in the K & E laboratories to give it the unique and valuable properties described below.
- COLOR** — White; pencil lines stand out better than on blue cloth, especially in bluish light.
- SURFACE** — Working side, matte surface suitable for hard pencil or ink. Other side, glazed. Both sides moisture proof.
- TRANSPARENCY** — Tracing: Better than ordinary pencil cloths, equal to most ink cloths.
— Blueprinting: Equal to other pencil cloths.
- ERASING QUALITY** — Exceptionally good. Ink or pencil lines are quickly removed without leaving "ghosts".
- USES** — Considered by many users to be the outstanding tracing cloth either for direct pencil drawings or for ink tracings, PHOENIX encourages fast accurate work, and produces clear strong prints.
- (1) PHOENIX is so water-resistant that it can actually be immersed in water for 10 minutes without injury. Opaque water-stains from perspiration common on ordinary cloths do not occur on PHOENIX cloth.
 - (2) PHOENIX has a 'hard surface together with considerable pencil-taking "tooth" which means that a 6H pencil with ordinary pressure will produce a firm reproducible line. Such hard pencil lines do not readily smudge.
 - (3) The PHOENIX surface permits just the right amount of penetration of ink or pencil for a permanent bond, yet when necessary, markings can be removed with remarkable ease leaving practically no evidence behind.

166. ROLLS 20 yards long and in the following widths:
 30 in. 36 in. 42 in. 54 in.

166. SHEETS Sizes as ordered, plain or imprinted.



TRACING CLOTHS (CONTINUED)

ARKWRIGHT PENCIL CLOTH (for Pencil or Ink Drawings)

COLOR —White.

SURFACE —One side dull, one side glazed.

167. ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.

167. SHEETS Sizes as ordered; plain or imprinted.

DRAWING CLOTH

COLUMBIA

TRADE MARK


A heavy opaque smooth surfaced cloth, suitable for both pencil and ink. It is especially recommended for outdoor and shop work, since it will withstand an unlimited amount of rough handling.

COLUMBIA: Light Weight, Opaque.

169L. ROLLS 10 yards long and in the following widths:
30 in. 36 in. 42 in.

COLUMBIA: Heavy Weight, Opaque.

169H. ROLLS 10 yards long and in the following widths:
30 in. 36 in. 42 in. 54 in.


 KEUFFEL & ESSER CO., NEW YORK

TRACING PAPERS

PREPARED TRACING PAPERS

Formerly, tracing papers, as their name implies, were used almost exclusively for the ink tracing of pencil drawings made on opaque paper. Transparency was a prime requirement; resistance to severe handling and erasing qualities were of secondary importance.

Today, the usual drafting practice is to develop the drawing directly on the transparent paper, from which reproductions of the original drawing can be made, thus saving time, expense and checking involved in the tracing process.

But this practice imposes new necessary qualities in the tracing paper used. In addition to good transparency, the modern high grade tracing paper must be able to withstand repeated erasures, must have good "pencil taking" quality and must withstand a considerable amount of handling without damage. Moreover, in most cases the paper must be able to maintain its transparency and strength for a long period of time to avoid the eventual necessity of retracing the drawings.

It is because ALBANENE tracing paper possesses all of these desirable attributes that it can be recommended without qualifications above all others for finished drawings. Unlike oil prepared papers which have a tendency to deteriorate or lose transparency with age, ALBANENE owes its high transparency to a special substance which is not affected in any way whatsoever by age or varying atmospheric conditions.

NATURAL TRACING PAPERS

When all of the fine qualities possessed by ALBANENE are not considered essential, a natural tracing paper, that is one that contains no transparentizing agent, may be used.

If such a paper is required for permanent drawings a 100% rag stock paper should be selected, as such a paper will not deteriorate with age. When these papers are made very thin they are fairly transparent but they must be handled with care. Heavier weight papers of this type will withstand handling more satisfactorily but do not possess sufficient transparency so that clear, legible blueprints can be made quickly from them.

When a paper is needed for sketching purposes and it is not to be kept permanently, a part rag stock paper is often used. Such a paper possesses moderate strength and fair transparency.

When neither permanence nor strength is a necessary quality a sulphite paper can be used. These papers are quite transparent but have little strength and have a tendency to become brittle as they age.

DESCRIPTIONS

It will be noted that in the descriptions of the various tracing papers, both blueprinting and tracing transparency is indicated. This is done as these do not always run parallel. For example, papers with a slight yellowish cast might possess a high degree of visual transparency but might not possess a good blueprinting transparency on account of the tendency of such color to hold back the violet or blue lights which are most effective for blueprint work.



NATURAL WHITE TRACING PAPERS

ALBATROSS

TRADE MARK

- STOCK —100% highest grade new white rags.
 SURFACE —Fine uniform tooth; primarily for pencil work.
 TRANSPARENCY—Tracing: Good.
 —Blueprinting: Good.
 STRENGTH —Exceptionally resistant to tearing and to the effects of repeated foldings.
 PERMANENCE —Excellent, will last indefinitely.
 USES —ALBATROSS is an excellent medium for rapid, erasable work which prints very well and is strong, durable and compact enough for satisfactory permanent storage.

ALBATROSS Thickness approx. .0018 in.

- N172.** ROLLS 20 yards long and in the following widths:
 36 in. 42 in. 57 in.
N172X. ROLLS 50 yards long and in the following widths:
 36 in. 42 in. 57 in.
N172. SHEETS Sizes as ordered; plain or imprinted.

SWAN BOND

REG. U. S. PAT. OFF.

- STOCK —100% highest grade new white rags.
 SURFACE —Fairly smooth, for pencil or ink.
 TRANSPARENCY—Tracing: Fair.
 —Blueprinting: Fair.
 STRENGTH —Very strong and tough.
 PERMANENCE —Excellent, will last indefinitely.
 USES —Especially adapted for use where permanence of records and economy of storage space are important factors.

SWAN BOND Thickness approx. .0023 in.

- N173.** ROLLS 20 yards long and in the following widths:
 36 in. 42 in.
N173X. ROLLS 50 yards long and in the following widths:
 36 in. 42 in.
N173. SHEETS Sizes as ordered; stocked in: 24 × 36 in.

SWAN BOND Thickness approximately .0027 in.

- N173M.** ROLLS 20 yards long and in the following widths:
 36 in. 42 in.
N173MX. ROLLS 50 yards long and in the following widths:
 36 in. 42 in.
N173M. SHEETS Sizes as ordered; stocked in: 24 x 36 in.

KEUFFEL & ESSER CO., NEW YORK

NATURAL WHITE TRACING PAPERS

(CONTINUED)

BANKNOTE

TRADE MARK

- STOCK** —100% clean high grade rags.
- SURFACE** —Nos. 174L and 174: finely grained.
174LS and 174S: smooth.
- TRANSPARENCY** —Tracing Nos. 174L and 174LS: fair.
Nos. 174 and 174S: medium.
—Blueprinting Nos. 174L and 174LS: fair.
Nos. 174 and 174S: medium.
- STRENGTH** —A very strong tough paper, which will withstand considerable rough treatment.
- PERMANENCE** —Excellent, will last indefinitely.
- USES** —For general direct drawing for reproduction in ink or pencil.
Suitable for tracing bold work. Recommended where resistance to rough handling, erasing quality, permanence, economy of storage are more important than a high degree of transparency.

BANKNOTE TRACING PAPER

	THICKNESS	20 YARD ROLLS				50 YARD ROLLS				SHEETS 24 X 36* in.
		30 in.	36 in.	42 in.	54 in.	30 in.	36 in.	42 in.	54 in.	
174L.	.002 in.	X	X	X	X					X
174LX.	"					X	X	X	X	
174LS.	"			X	X					X
174LSX.	"						X	X		
174.	.0025 in.	X	X	X	X					X
174X.	"					X	X	X	X	
174S.	"			X	X					X
174SX.	"						X	X		

*Other size sheets as ordered, plain or imprinted.



NATURAL WHITE TRACING PAPERS

(CONTINUED)

ECCO

REG. U. S. PAT. OFF.

- STOCK — High percentage of high grade rags.
- SURFACE — Finely grained; takes pencil, ink or water color.
- TRANSPARENCY — Tracing: No. 176L, good.
No. 176, fair.
- Blueprinting: No. 176L, good.
No. 176, fair.
- STRENGTH — A strong paper. Will stand a surprising amount of abuse.
- PERMANENCE — Very good.
- USES — Due to its strength and comparatively low cost ECCO is a practical tracing paper for a large class of work. For tracing fine line drawings a more transparent paper should be preferred.

ECCO LIGHT. thickness approx. .0022 in.

- 176L. ROLLS 20 yards long and in the following widths:
36 in. 42 in.
- 176LX. ROLLS 50 yards long and in the following widths:
36 in. 42 in.
- 176L-31. ROLLS 2½ yards long and 18 inches wide.
- 176L-34. ROLLS 2½ yards long and 36 inches wide.
- 176L-1. SHEETS IN ENVELOPE 100 sheets 8½ × 11 in.
- 176L-3. SHEETS IN ENVELOPE 100 sheets 12 × 18 in.
- 176L-6. SHEETS 100 sheets 18 × 24 in.
- 176L. SHEETS Other sizes as ordered; plain or imprinted.

ECCO thickness approx. .0025 in.

176. ROLLS 20 yards long and in the following widths:
36 in. 42 in.
- 176X. ROLLS 50 yards long and in the following widths:
36 in. 42 in.
- 176X. SHEETS Sizes as ordered; plain or imprinted.



NATURAL WHITE TRACING PAPERS

(CONTINUED)

SWALLOW

REG. U. S. PAT. OFF.

- SURFACE** —Smooth; good pencil taking quality.
- TRANSPARENCY** —Tracing: N179ET, very best.
 N179T, excellent.
 N179L, very good.
 N179, very good.
- Blueprinting: N179ET, very best.
 N179T, excellent.
 N179L, very good.
 N179, good.
- STRENGTH** —Not recommended for rough service.
- PERMANANCE** —Fair.
- USES** —Highly recommended for temporary drawings not subject to rough handling. Fine line pencil tracings or drawings on SWALLOW papers reproduce very well.

SWALLOW EXTRA THIN, thickness approx. .0016 in.

- N179ET.** ROLLS 20 yards long and in the following widths:
 36 in. 42 in.
- N179ETX.** ROLLS 50 yards long and in the following widths:
 36 in. 42 in.
- N179ET.** SHEETS Sizes as ordered; plain or imprinted.
- LAYOUT PADS Bound and perforated on short side; with manila cover and heavy bookbinder's board base.
- N179ET-21.** 100 sheets $8\frac{1}{2} \times 11$ in.
- N179ET-23.** 100 sheets 12×18 in.

SWALLOW THIN, thickness approx. .0019 in.

- N179T.** ROLLS 20 yards long and in the following widths:
 36 in. 42 in.
- N179TX.** ROLLS 50 yards long and in the following widths:
 36 in. 42 in.
- N179T-44.** ROLLS 5 yards long and 36 inches wide.
- N179T.** SHEETS Sizes as ordered; plain or imprinted.

(CONTINUED)

REG. U. S. PAT. OFF.

N179T-26. 100 sheets 18 × 24 in.

N179L-6. SHEETS IN PACKAGE. 100 sheets 18×24 in.

N179L-26. 100 sheets 18 × 24 in.

N179-11. SKETCH PAD. 50 sheets $8\frac{1}{2} \times 11$ in.

Sketch pad is furnished with one sheet of agate Bristol Board, having one side cross sectioned 8 x 8 to the inch and the other side 10 x 10 to the inch, with black lines, to serve as a legible guide and scale under the sketches on each sheet of the pad in turn. Pad is perforated close to 8½ in. edge, for easy removal of sheets.

KEUFFEL & ESSER CO., NEW YORK

PREPARED WHITE TRACING PAPER

ALBANENE

REG. U. S. PAT. OFF.

- STOCK** —100% long fiber pure white rags treated with a crystal-clear, inert synthetic solid developed in the K & E laboratories.
- SURFACE** —Takes pencil and ink smoothly and erases with ease. Because the surface is dry, it does not pick up dust, so that the drawings stay clean.
- TRANSPARENCY** —Tracing: Nos. 195T, 195L and 195M: very good.
—Blueprinting: Nos. 195T, 195L and 195M: very good.
- ERASING QUALITY**—Pencil lines are erased easily because they are held by a fine hard tooth and do not become imbedded in the paper. Ink lines are removable and re-inking does not spread or feather on erased areas.
- STRENGTH** —ALBANENE has extraordinary strength. It is made of 100% pure white rag stock with unusually long fibers—too long to be treated successfully by earlier transparentizing methods. These extra long fibers give Albanene its exceptional strength. Only the extraordinary penetrating power of the special K & E synthetic transparentizer, and its ability to impregnate “wild” fiber structures uniformly and completely, make the use of this strong base paper possible.
- PERMANENCE** —ALBANENE will retain all its desirable working qualities for years. It will not oxidize, turn yellow, become brittle, or lose transparency with age.
- USES** —ALBANENE rates so highly in all important requirements of a high grade tracing paper that there is no limitation on its utility values for almost any class of work, either for tracings, or original drawings. ALBANENE makes strong blue prints, and is equally useful for other types of reproductions.
-
-



PREPARED WHITE TRACING PAPER
(CONTINUED)

ALBANENE CONTINUED
REG. U. S. PAT. OFF.

ALBANENE THIN, thickness approx. .0023 in.

- 195T. ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195TX. ROLLS 50 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195T. SHEETS Any size as ordered, stocked in the following sizes:
19×24 in. 22×30 in. 24×36 in. 30×42 in.

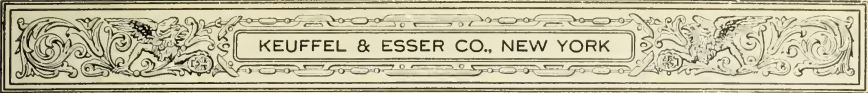
ALBANENE LIGHT, thickness approx. .0027 in.

- 195L. ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195LX. ROLLS 50 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195L. SHEETS Any size as ordered, stocked in the following sizes:
19×24 in. 22×30 in. 24×36 in. 30×42 in.
- 195L-11. SKETCH PAD. 50 sheets $8\frac{1}{2} \times 11$ in.
- 195L-12. SKETCH PAD. 50 sheets 11×17 in.

Nos. 195L-11 and 195L-12 are furnished with one sheet of agate Bristol Board, having one side cross sectioned 8 x 8 to the inch and the other side 10 x 10 to the inch, with black lines, to serve as a legible guide and scale under the sketches on each sheet of the pad in turn. Pad is perforated for easy removal of sheets.

ALBANENE MEDIUM, thickness approx. .0031 in.

- 195M. ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195MX. ROLLS 50 yards long and in the following widths:
30 in. 36 in. 42 in.
- 195M. SHEETS Any size as ordered, stocked in the following sizes:
19×24 in. 22×30 in. 24×36 in. 30×42 in.


 KEUFFEL & ESSER CO., NEW YORK

WHITE MINERAL OIL TRACING PAPER

CRYSTALLINE

TRADE MARK

- STOCK** —100% white rag, transparentized with special mineral oil.
- SURFACE** —Finely grained pencil surface.
- TRANSPARENCY** —Tracing: Good.
—Blueprinting: Good.
- ERASING QUALITY**—Very good.
- STRENGTH** —Very strong, resists tearing and may be folded repeatedly.
- PERMANENCE** —Paper is permanent, but transparency will decrease with passage of time.
- USES** —For those who prefer a mineral oil paper CRYSTALLINE will be found to be of highest quality. The oil will not readily leave the paper.

CRYSTALLINE THIN, thickness approx. .0023 in.

- 198T.** ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 198TX.** ROLLS 50 yards long and in the following widths:
30 in. 36 in. 42 in.
- 198T.** SHEETS Sizes as ordered; plain or imprinted.

CRYSTALLINE MEDIUM, thickness approx. .0027 in.

- 198M.** ROLLS 20 yards long and in the following widths:
30 in. 36 in. 42 in.
- 198MX.** ROLLS 50 yards long and in the following widths:
30 in. 36 in. 42 in.
- 198M.** SHEETS Sizes as ordered; plain or imprinted.

CRYSTALLINE MEDIUM, thickness approx. .0027 in.

- P198M.** ROLLS 20 yards long and in the following width: 54 in.
- P198MX.** ROLLS 50 yards long and in the following width: 54 in.
- P198M.** SHEETS Sizes as ordered; plain or imprinted.

KEUFFEL & ESSER CO., NEW YORK

K & E

PROFILE AND CROSS SECTION PAPERS AND CLOTHS

Special attention is called to the **high quality** of paper and cloth that is used for the Profile and Cross Section Papers and Cloths in sheets and in continuous rolls described in the following pages. These are as follows:

Drawing Paper: Very high quality, 100% rag stock of great strength and cleanness; hard sized; and of very good erasing quality. Thickness: Heavy .0055 in., Medium .0036 in., approximately.

Mounted Drawing Paper: Made in the same high quality as our regular mounted drawing papers.

Tracing Paper: The term "Tracing Paper" indicates a very high quality 100% clean high grade rag stock, of very high strength, which will withstand rough handling. Tracing and blueprinting transparency: fair. Thickness .0022 in. approximately. The term "ALBANENE Tracing Paper" indicates No. 195L.

Tracing Cloth: All STANDARD Profile and Cross Section Cloths are Imperial Tracing Cloth. All STANDARD Tracing Cloths are section lined with a special erasible ink, so that an area of the section lining may be removed if desired (with alcohol). Benzine or carbon tetrachloride used to clean the tracing will not affect the ink.

Columbia Cloth: A heavy, opaque (not transparent), smooth surfaced cloth, suitable for both pencil and ink. It is especially recommended for outdoor and shop work, since it will withstand considerable rough handling.

All STANDARD Profile and Cross Section sheets and continuous rolls are engraved in our factory in Hoboken, N. J., on well seasoned stock. This reduces the expansion and shrinkage of the paper and cloth to a minimum, thus insuring the highest possible accuracy in the spacing of the lines.

KEUFFEL & ESSER CO., NEW YORK

STANDARD

REG. U. S. PAT. OFF.

PROFILE PAPERS AND CLOTHS

IN CONTINUOUS ROLLS.

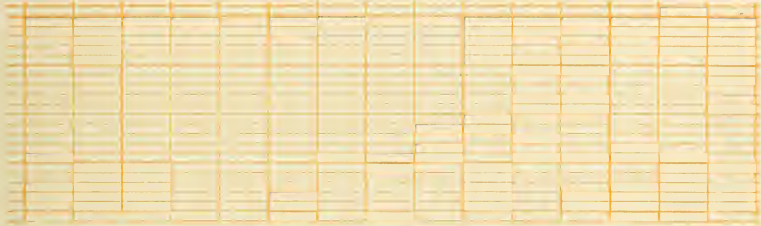


Plate A. 4 X 20 to the inch.

Profile lines, 20 to the inch, 5th lines accented, 50th lines heavy.
Vertical lines, 4 to the inch, 10th lines heavy.

		Width of Roll	Width of Engraving	Color of Lines	Length of Roll
253 G.	Drawing Paper, heavy	22 in.	20 in.	green	50 yds.
253 R.	" " "	22 "	20 "	orange	"
254 G.	" " "	12 "	10 "	green	"
255 G.	Mounted on muslin,	22 "	20 "	"	20 yds.
257 R.	Tracing Paper,	22 "	20 "	orange	50 yds.
A257 R.	Albanene Tracing Paper.	22 "	20 "	"	20 yds.
257 1/2 R.	Tracing Paper,	12 "	10 "	"	50 yds.
258 R.	Imperial Tracing Cloth,	24 "	20 "	"	20 yds.
258 1/2 R.	" " "	12 1/2 "	10 "	"	"

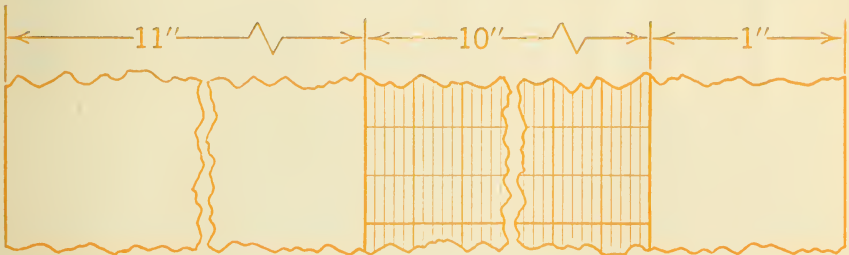


Plate A. Profile-Plan.

Profile-Plan papers and cloths have approximately half the width of the roll left blank for explanatory maps, sketches, memoranda, etc.

		Width of Roll	Width of Engraving	Color of Lines	Length of Roll
253 HG.	Drawing Paper, heavy	22 in.	10 in.	green	50 yds.
257 HR.	Tracing Paper,	22 "	10 "	orange	"
257 1/2 HR.	" " "	12 "	5 "	"	"
258 HR.	Imperial Tracing cloth,	24 "	10 "	"	20 yds.
258 1/2 HR.	" " "	12 1/2 "	5 "	"	"



STANDARD

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PROFILE - PLAN PAPERS AND CLOTHS

IN CONTINUOUS ROLLS.

(CONTINUED)

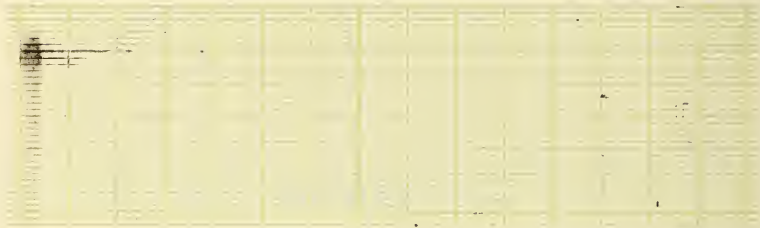


Plate B. 4 X 30 to the inch.

Profile lines, 30 to the inch, 5th lines accented, 25th lines heavy.
Vertical lines, 4 to the inch, 10th lines heavy.

		Width of Roll	Width of Engraving	Color of Lines	Length of Roll
263G.	Drawing Paper, heavy	22 in.	20 in.	green	50 yds.
264G.	" " "	12 "	9 "	"	"
265G.	Mounted on muslin,	22 "	20 "	"	20 yds.
267R.	Tracing Paper,	22 "	20 "	orange	50 yds.
267 $\frac{1}{2}$ R.	" " "	12 "	9 "	"	"
268R.	Imperial Tracing Cloth,	24 "	20 "	"	20 yds.



Plate B. Profile-Plan.

Profile-Plan papers and cloths have approximately half the width of the roll left blank for explanatory maps, sketches, memoranda, etc.

		Width of Roll	Width of Engraving	Color of Lines	Length of Roll
263 HG.	Drawing Paper, heavy	22 in.	9 in.	green	50 yds.
267 HR.	Tracing Paper,	22 "	9 "	orange	"
268 HR.	Imperial Tracing cloth,	24 "	9 "	"	20 yds.

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STANDARD

REG. U. S. PAT. OFF.

CROSS SECTION PAPERS AND CLOTHS

10 × 10 to the inch,
Nos. 280 and 283 to 289, incl.

10 × 10 to the inch, 5th lines heavy
Nos. 282G and 282½G

	Size of Sheet	Size of Engraving	Color of Lines	
280G. Drawing Paper, heavy	18 × 23 in.	16 × 20 in.	green	
280TR. Tracing Paper,	"	"	orange	
	Width of Roll	Width of Engraving	Color of Lines	Length of Roll
282G. Drawing Paper, heavy	26 in.	24 in.	green	50 yds.
282½G. Tracing Paper,	26 "	24 "	"	"
283G. Drawing Paper, heavy	22 "	20 "	"	"
283R. " " "	22 "	20 "	orange	"
283B. " " "	22 "	20 "	blue	"
283K. " " "	22 "	20 "	black	"
283HG. " " "	22 "	10 "	green	"
284G. " " "	12 "	10 "	"	"
285G. Mounted on muslin,	22 "	20 "	"	20 yds.
287G. Tracing Paper,	22 "	20 "	"	50 yds.
287R. " " "	22 "	20 "	orange	"
287B. " " "	22 "	20 "	blue	"
287HR. " " "	22 "	10 "	orange	"
A287R. Albanene Tracing Paper	22 "	20 "	"	20 yds.
288G. Imperial Tracing Cloth,	24 "	20 "	green	"
288R. Imperial Tracing Cloth,	24 "	20 "	orange	"
289G. Columbia Drawing Cloth,	22 "	20 "	green	"

16 × 16 to the inch, 4th lines accented, 8th lines heavy

	Size of Sheet	Size of Engraving	Color of Lines	
290G. Drawing Paper, heavy	18 × 23 in.	16 × 20 in.	green	
290TR. Tracing Paper,	"	"	orange	
	Width of Roll	Width of Engraving		Length of Roll
293G. Drawing Paper, heavy	22 in.	20 in.	green	50 yds.

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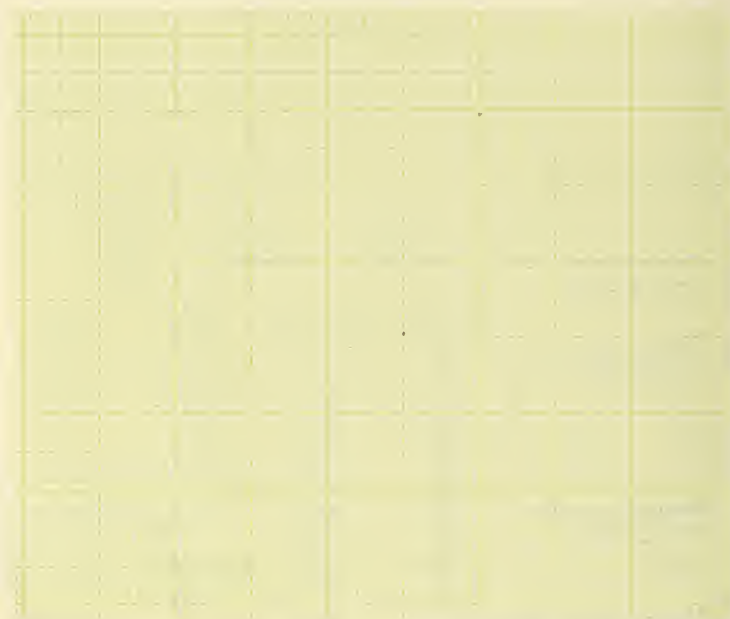
STANDARD

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CROSS SECTION PAPERS AND CLOTHS

IN SHEETS AND IN CONTINUOUS ROLLS.

(CONTINUED)



Millimeters, 5, 10 and 50 mm. lines progressively accented.

		Size of Sheet	Size of Engraving.	Color of Lines	
300 G.	Drawing Paper, heavy	18×23 in.	40×50 cm.	green	
300 TR.	Tracing Paper,	"	"	orange	
		Width of Roll.	Width of Engraving	Color of Lines	Length of Roll
303 G.	Drawing Paper, heavy	22 in.	50 cm.	green	50 yds.
303 R.	" " "	22 "	50 "	orange	"
305 G.	Mounted on muslin	22 "	50 "	green	20 yds.
306 G.	Drawing Paper, heavy	32 "	75 "	"	50 yds.
306 R.	" " "	32 "	75 "	orange	"
307 R.	Tracing Paper,	22 "	50 "	"	"
307 ½ R.	" " "	32 "	75 "	"	"
A307 ½ R.	ALBANENE Trac. Paper	32 "	75 "	"	20 yds.
308 G.	Mounted on muslin,	32 "	75 "	green	"
308 ½ G.	Imperial Tracing Cloth,	24 "	50 "	"	"
308 ½ R.	" " "	24 "	50 "	orange	"
309 R.	" " "	33 ½ "	75 "	"	"
310 G.	Drawing Paper, heavy	42 "	100 "	green	50 yds.
310 TR	Tracing Paper,	42 "	100 "	orange	"

All "STANDARD" Cross Section Papers and Cloths bear this trade mark along the margin.

For quality of papers and cloths shown on this page, see page 40.



STANDARD

REG. U. S. PAT. OFF.

CROSS SECTION PAPERS.

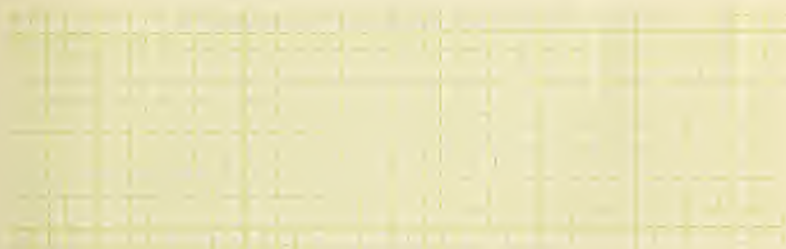
(CONTINUED)

IN SHEETS.



5 × 5 to the half-inch.

	Size of Sheet	Size of Engraving	Color of Lines
320 G. Drawing Paper, heavy	18 × 23 in.	16 × 20 in.	green
320 TR. Tracing Paper,	"	"	orange



12 × 12 to the inch, 3d line accented, 6th line heavy.

	Size of Sheet	Size of Engraving	Color of Lines
322 G. Drawing Paper, heavy	18 × 23 in.	16 × 20 in.	green

KEUFFEL & ESSER CO., NEW YORK

CROSS SECTION PAPER

30 IN. ENGRAVING. IN CONTINUOUS ROLLS.

This Cross Section Paper is intended for architectural and mechanical full-size detail sketches.



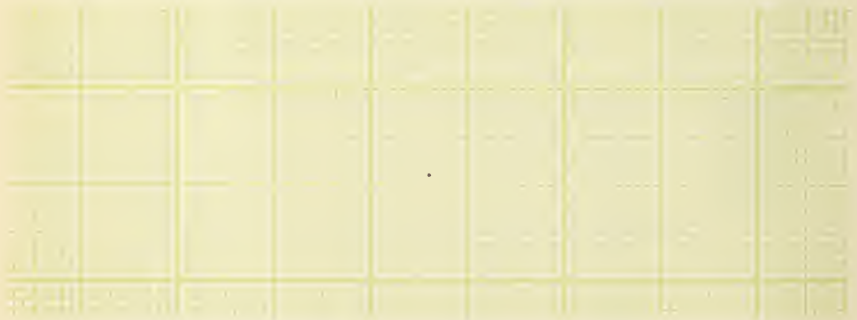
8 × 8 to the inch, every 4th line accented, 8th line heavy.

	Width of Roll	Width of Engraving	Color of Lines	Length of roll
326 D. White Detail Paper,	32 in.	30 in.	orange	50 yds.

White drawing paper of fairly heavy weight.

CROSS SECTION PAPER

PRINTED FROM ENGRAVED PLATE. IN SHEETS.



20 × 20 to the inch, 5th, 10th and inch lines progressively accented.

	Size of Sheet	Size of Engraving	Color of Lines
329. Drawing Paper, medium	17 × 22 in.	15 × 20 in.	green

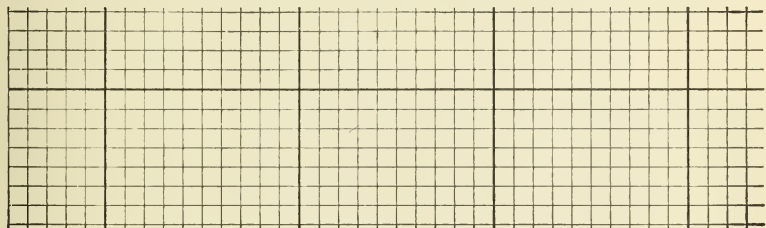
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RULED CROSS SECTION PAPERS



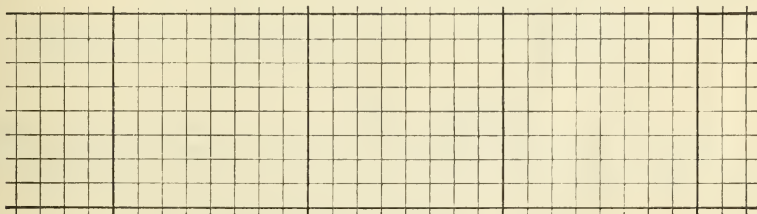
Sheets, 17×22 in., 5×5 to the inch, ruled blue

- N330.** Drawing Paper, heavy weight
N330L. Drawing Paper, medium weight



Sheets, 17×22 in., 10×10 to the inch, ruled blue

- N331.** Drawing Paper, heavy weight
N331L. Drawing Paper, medium weight



Sheets, 17×22 in., 8×8 to the inch, ruled blue

- N332.** Drawing Paper, heavy weight
N332L. Drawing Paper, medium weight



Topographical Paper, Sheets, 17×22 in., 400 feet to the inch, ruled red and blue.

- N333.** Drawing Paper, heavy weight

KEUFFEL & ESSER CO., NEW YORK

CONSTRUCTOR'S CROSS SECTION PAPERS AND CLOTHS IN SHEETS AND CONTINUOUS ROLLS.



No. 334-1G.
No. 334-1TG.

No. 334-2G.
No. 334-2TG.

No. 334-3G.
No. 334-3TG.

10 × 10 to the half inch, 5th lines accented.

This popular decimally ruled cross-section is available in three sheet sizes and also in continuous rolls, printed on drawing paper, tracing paper and tracing cloth, in blue, green, orange and black ink. Blue ink reproduces very faintly or not at all, green and orange fairly strong and black very strong.

SHEETS		Size of Sheet	Size of Engraving	Color of Lines	
334-1G.	Drawing Paper, medium	7×8½ in.	5×7½ in.	green	
334-1TG.	Tracing Paper,	"	"	"	
334-2G.	Drawing Paper, medium	8½×12¼ in.	7½×10 in.	green	
334-2B.	" " "	"	"	blue	
334-2K.	" " "	"	"	black	
334-2TG.	Tracing Paper,	"	"	green	
334-2TB.	" " "	"	"	blue	
334-2TR.	" " "	"	"	orange	
334-2CR.	Imperial Tracing Cloth	"	"	"	
334-3G.	Drawing Paper, medium	11½×17 in.	10×15 in.	green	
334-3TG.	Tracing Paper,	"	"	"	
334-3TR.	" " "	"	"	orange	
334-3CR.	Imperial Tracing Cloth	"	"	"	
ROLLS		Width of Roll	Width of Engraving		Length of roll
334½G.	Drawing Paper, heavy	22 in.	20 in.	green	50 yds.
334½TG.	Tracing Paper,	"	"	"	"

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LOGARITHMIC PAPERS

Among the various relationships which may be represented by means of these papers, are: Circumferences and areas of circles in terms of their radii or diameters, or the inverse; moments of inertia and radii of gyration in terms of a linear dimension, or the inverse; length of pendulum and time of oscillation; powers and roots of any and all indices; weights of a series of bodies of the same substance and form but of varying size, or the inverse, in terms of a linear dimension: sizes of shafts, struts, tie bars, etc., in terms of varying load, or the inverse; shearing stress, bending moment or deflection of beams, or the inverse in terms of load, etc., etc.

DURAND'S LOGARITHMIC PAPER.



		Size of Sheet	Size of Engraving	Color of Lines
N336.	Drawing Paper, medium	$11\frac{1}{2} \times 11\frac{1}{2}$ in.	25×25 cm. ($9\frac{1}{8} \times 9\frac{1}{8}$ in.)	green

This paper has a single 25 cm. logarithmic scale in each direction.

JENSEN'S LOGARITHMIC PAPER



		Size of Sheet	Size of Engraving	Color of Lines
336 J.	Tracing Paper,	$11\frac{1}{2} \times 17$ in.	10×10 in.	orange

Jensen's Logarithmic Paper is similar to Durand's, but has two 5 in. logarithmic scales in each direction, instead of one.

KEUFFEL & ESSER CO., NEW YORK

LOGARITHMIC PAPERS

(CONTINUED)

TIME-CURRENT CHARACTERISTIC



This paper admits of a clear presentation of the data on established current ratings of fuse links within the time and current scales that are required in the application of these links. A box of printed matter below the engraving was standardized to establish a uniform method of briefly presenting the pertinent information on which the data shown by the graph is based. The sheet has $4\frac{1}{2}$ logarithmic cycles, numbered from 0.5 to 10,000, in one direction, and 5 logarithmic cycles, numbered from 0.01 to 1000, in the other direction. While this paper is the standard established by the Joint Committee on Distribution Cut-out Standards of the National Electric Manufacturers Association and the Edison Electric Institute, it can likewise be employed for plotting time-current characteristics of any other apparatus to which the time and current scales used in the graph sheet can be applied.

	Size of Sheet	Size of Engraving	Color of Lines
336E. Tracing Paper,	$10\frac{1}{2} \times 15$ in.	$9\frac{1}{2} \times 11\frac{1}{16}$	green

SEMI-LOGARITHMIC PAPER



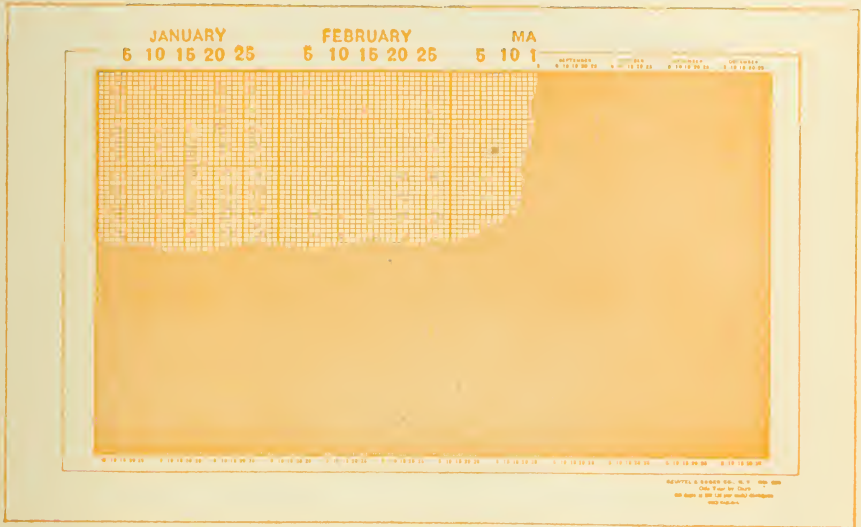
	Size of Sheet	Size of Engraving	Color of Lines
336P. Drawing Paper, heavy	16×21 in.	25×50 cm.	green

The ordinate measures 25 cm. and has a single logarithmic scale; the space from 1 to 2, having twenty sub-divisions and from 2 to 3, 3 to 4 etc., up to 10, having ten divisions. The abscissa is divided into equal parts of one millimeter.



PROGRESS CROSS SECTION PAPER

TRADE MARK



	Size of Sheet	Size of Engraving	Color of Lines
338. Tracing Paper,	8½ × 14 in.	7 × 12 in.	orange

The base line is divided into 366 equal parts, corresponding to the number of days per year (365 or 366). Heavy lines separate the twelve months, the names being printed at the head of each column, and every fifth day numbered. Of the 260 horizontal lines, every tenth line is heavy to facilitate reading.

ISOMETRIC CROSS SECTION PAPER



	Size of Sheet	Size of Engraving	Color of Lines
342B. Tracing Paper,	10¾ × 13¼ in.	9 × 12 in.	green
342C. Drawing Paper, medium	13 × 19	12 × 18	"

For other Isometric Paper, see pages 63 and 64.

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POLAR CO-ORDINATE PAPER



	Size of Sheet	Size of Engraving	Color of Lines
343A. Drawing Paper, medium	$8\frac{1}{2} \times 11$ in.	18×25 cm.	green
343B. Tracing Paper,	"	"	"

These papers are Degree Polar Co-ordinate, divided to 2° .

TRIANGULAR CO-ORDINATE PAPER



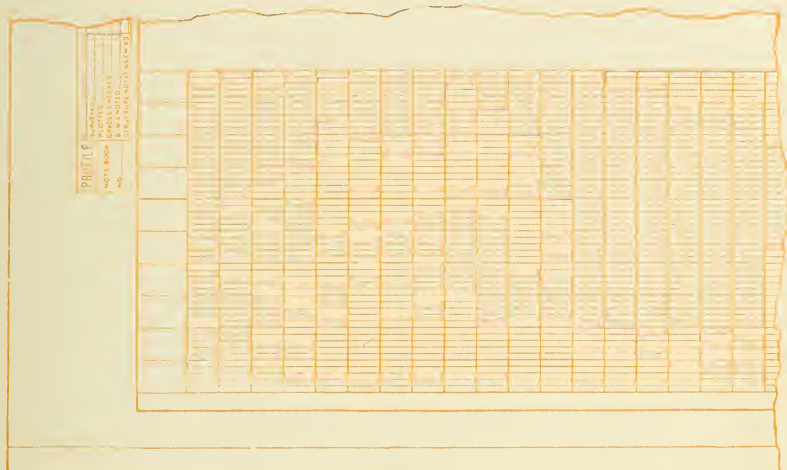
	Size of Sheet	Size of Engraving	Color of Lines
344 A. Tracing Paper,	$8\frac{1}{2} \times 12\frac{1}{4}$ in.	Side 200mm.	green

For the graphical expression of three variables composing a constant sum. The engraving is an equilateral triangle, each side 200 mm. long, divided into 100 equal parts. These divisions are connected by rulings parallel to the sides, every fifth line heavy.



FEDERAL AID SHEETS

as recommended by the
U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING.



No. 345-2

PLATE 1. FOR PROFILES AND PLANS.

Sheet Size	—23 × 36 in.
Profile Size	—10 × 33½ in.
Divisions	— 2 × 10 to the inch.
Plan Space	—10¾ × 33½ in. left blank above profile.
Title Blocks	—two.

PLATE 2. FOR FLAT PROFILES AND PLANS.

Sheet Size	—23 × 36 in.
Two Profiles, each	— 5 × 33½ in.
Divisions	— 2 × 10 to the inch.
Two Plan Spaces	—each 5¼ × 33½ in. above profiles.
Title Blocks	—two.

- 345-1. Plate 1, printed in orange on Tracing Paper.
345-2. Plate 2. " " " " " "

Tracing paper is 100% clean white rag natural tracing paper of great strength and permanence. Thickness .0022 in. approx.

NOTE:—Plate 1 or 2 printed on No. 195L Albanene Tracing Paper to special order in quantity.

- 346-1C. Plate 1, printed in orange on Imperial Tracing Cloth in reverse type on glazed side.
346-2C. Plate 2, printed in orange on Imperial Tracing Cloth in reverse type on glazed side.

NOTE:—Plate 1 or 2 printed on No. 166 Phoenix Tracing Cloth or on No. 158 Arkwright Tracing Cloth to special order in quantity.

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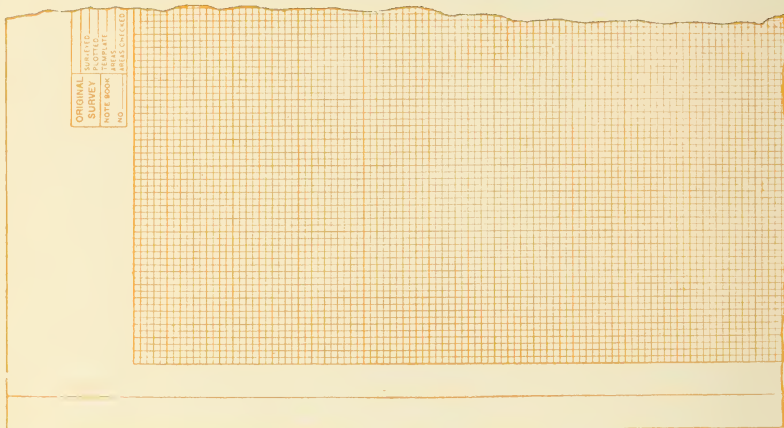
FEDERAL AID SHEETS

(CONTINUED)

as recommended by the

U. S. DEPARTMENT OF AGRICULTURE,

OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING.



No. 345-3.

PLATE 3.

CROSS SECTION.

- Sheet Size —23 × 36 in.
- Cross-section Size —21 × 33½ in.
- Divisions —10 × 10 to the inch, tenth lines heavy; 2nd, 4th, 6th and 8th lines accented.
- Title Blocks —two, one each for original and final surveys.

PLATE 4.

CROSS SECTION AND PLAN.

- Sheet Size —23 × 36 in.
- Cross-section Size —10 × 33½ in.
- Divisions —10 × 10 to the inch, tenth lines heavy; 2nd, 4th, 6th and 8th lines accented.
- Plan Space —11 × 33½ in. left blank above cross sections.
- Title Blocks —two, one each for original and final surveys.

345-3. Plate 3, printed in orange on Tracing Paper.

345-4. Plate 4, " " " " " "

Tracing paper is 100% clean white rag natural tracing paper of great strength and permanence. Thickness .0022 in. approx.

NOTE:—Plate 3 or 4 printed on No. 195L Albanene Tracing Paper to special order in quantity.

346-3C. Plate 3, printed in orange on Imperial Tracing Cloth, in reverse type on glazed side.

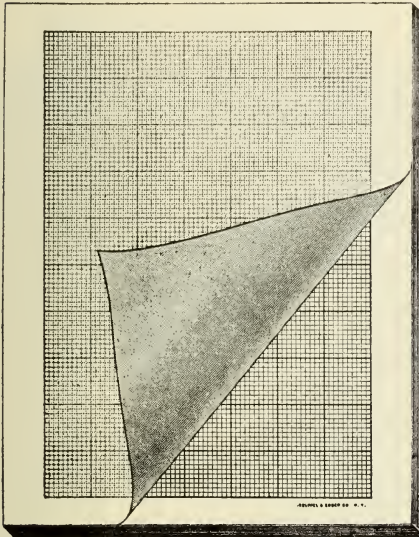
346-4C. Plate 4, printed in orange on Imperial Tracing Cloth, in reverse type on glazed side.

NOTE:—Plate 3 or 4 printed on No. 166 Phoenix Tracing Cloth or on No.158 Arkwright Tracing Cloth to special order in quantity.

KEUFFEL & ESSER CO., NEW YORK

K & E

TRANSPARENT SKETCHING PADS

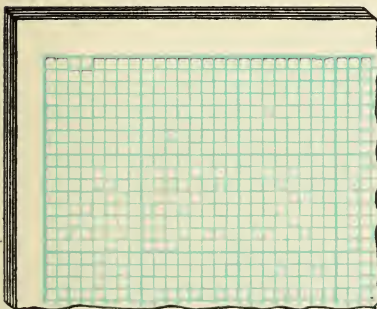


K & E Transparent Sketching Pads provide a simple and convenient medium for securing rapid and accurate sketches in Drafting, Designing, Engineering and Architectural work. In the school they enable the Student Draftsman to attain facility in freehand drawing and lettering. The sketches thus obtained are converted into permanent records by the simple process of blueprinting.

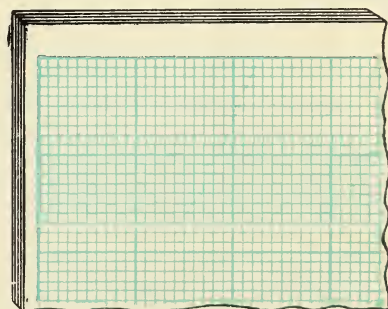
Each pad consists of 50 sheets of tracing paper, $8\frac{1}{2} \times 11$ in., on a backing of heavy cardboard; and each pad includes one sheet of agate Bristol board having one side cross-sectioned 8×8 to the inch in black lines, the other 10×10 to the inch. Inserted under the top sheet, the Bristol board serves both as a stiff backing and as a guide and scale for each sheet of the pad in turn. This arrangement will be found extremely convenient for sketching work, and being on tracing paper, sketches can be reproduced if desired.

353B. K & E Transparent Sketching Pad, 50 sheets, $8\frac{1}{2} \times 11$ in., tracing paper with 1 cross section sheet. Similar Sketch pads are available under the following catalog numbers: **N179-11. See page 36. 195L-11 See page 38.**

CROSS SECTION PADS



No. 353-8



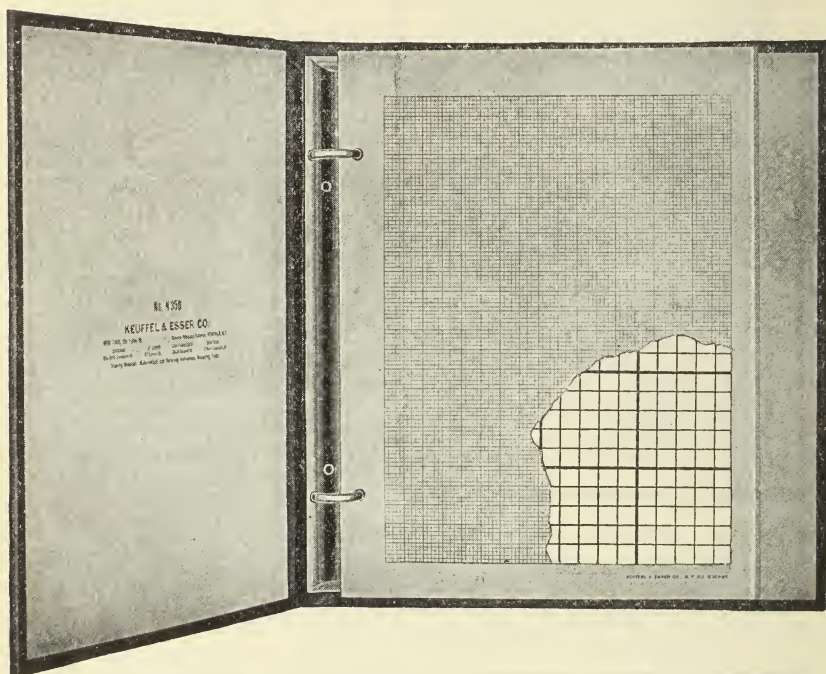
353-10.

All pads $8\frac{1}{2} \times 11$ in. section lined in blue.

Pad of 25 sheets	Pad of 50 sheets	Drawing Paper Medium	Section Lining	Size of Plate
353-4	353-4X		4×4 to 1 in.	7×10 in.
353-5	353-5X	" "	5×5 to 1 in.	7×10 in.
353-8	353-8X	" "	8×8 to 1 in.	8×10 in.
353-10	353-10X	" "	10×10 to 1 in.	8×10 in.
353-14	353-14X	" "	Millimeters	18×25 cm.

KEUFFEL & ESSER CO., NEW YORK

LOOSE LEAF BINDERS



Loose Leaf Binders Nos. 356 and 356L are strongly made and durable. The heavy stiff covers are finished on the outside with a durable black leather substitute having a levant grain, and on the inside with a strong black moire paper. The two snap rings are firmly secured to a nickelplated steel base, which in turn is bound into the back.

The capacity of these binders, in terms of K & E Graph Sheets, is as follows—about 200 sheets of No. 358 Drawing Paper; 375 sheets of No. 359H Heavy Tracing Paper; and 450 sheets of No. 359 Thin Tracing Paper.

356. Loose Leaf Binder, $9\frac{1}{4} \times 11\frac{3}{4}$ in., for sheets $8\frac{1}{2} \times 11$ in., punched on the long edge.

356L. Loose Leaf Binder, $11\frac{3}{8} \times 17\frac{3}{4}$ in., for sheets $11 \times 16\frac{1}{2}$ in., punched on the short edge.

KEUFFEL & ESSER CO., NEW YORK

K & E

GRAPH SHEETS

The **K & E GRAPH SHEETS** listed in the following section offer a wide variety of forms for graphical representation. The careful selection of the most suitable form will be rewarded by the convenience of its use.

SIZES

All sheets are either $8\frac{1}{2} \times 11$ inches or $11 \times 16\frac{1}{2}$ inches, and are punched with 5 holes on the 11 inch edge for K & E No. 356 and No. 356L two ring binders and also for standard three ring binders.

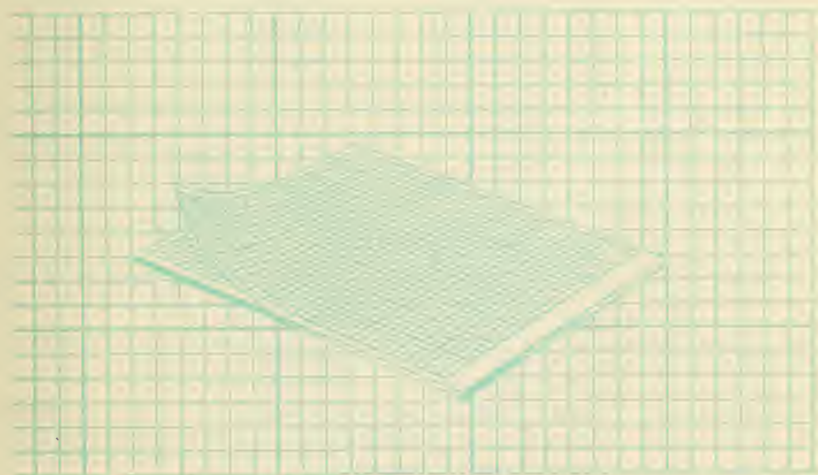
Plate sizes are usually 7 x 10 inches on the smaller, and 10 x 15 inches on the larger sheets, thus providing ample margins for numerical scales and notations.

PAPER

Sheets are available either on drawing paper or tracing paper. The drawing paper is a strong white medium weight paper with high rag content and good erasing qualities. The tracing paper is a strong, fairly thin high rag content natural tracing paper. On some plates a heavier natural 100% rag paper is available. On others ALBANENE Tracing Paper can also be furnished.

INKS

On drawing paper green ink is standard; on tracing paper orange ink is used, with green ink also available for many of the plates. Some plates are printed in pale blue ink, which does not reproduce on blueprints. Some plates are in black ink for use where a strong background is required.



358-3P.

GRAPH SHEETS IN PADS.

		Size of Sheet	Size of Plate	Color of Lines
		8×8 to 1 in.		
358-3P.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	8×10 in.	blue pad of 24 sheets
		10×10 to 1 in.		
358-5P.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	8×10 in.	blue pad of 24 sheets

*This plate 6×9 inches. †This plate $7\frac{1}{2} \times 10$ inches.



K & E
GRAPH SHEETS



358-3



359-3

358-3D

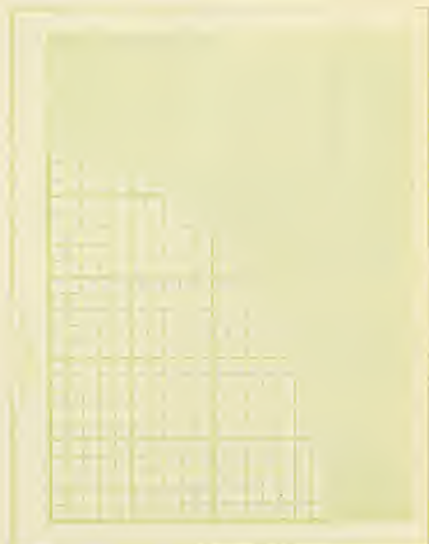
359-3DG



358-6

359-6G

359T-6G



358-8D

359-8DG


Samples of Square Sectioned Graph Sheets.

KEUFFEL & ESSER CO., NEW YORK

K & E

GRAPH SHEETS

358-9½	Size of Sheet	358-11	359-11G	359T-11G
	Millimeters, 5 mm. lines accented, cm. lines heavy.	Size of Plate	Color of Lines	
358-14. Drawing Paper,	8½×11 in.	18×25 cm.	green	
358-14B. " "	" "	" "	blue	
359-14. Tracing Paper,	" "	" "	orange	
359-14B. " "	" "	" "	blue	
359-14G. " "	" "	" "	green	
359T-14G Albanene Tracing Paper	" "	" "	"	
359H-14. Heavy Tracing Paper,	" "	" "	orange	
358-14L. Drawing Paper,	11×16½ in.	25×38 cm.	green	
359-14L. Tracing Paper,	" "	" "	orange	
359-14LG. " "	" "	" "	green	
359T-14LG Albanene Tracing Paper	" "	" "	"	
	2 Millimeters, Centimeter lines heavy.			
358-15G. Drawing Paper,	8½×11 in.	18×24 cm.	green	
358-15K. " "	" "	" "	black	
359-15G. Tracing Paper,	" "	" "	green	
	6×8 divisions per unit.			
162 divisions short side, every 6th line heavy, equivalent to 27 weeks of 6 days each; 200 divisions long side, every 8th line heavy and every 2nd line accented. For charting prices of stock and bonds.				
358-17. Drawing Paper,	8½×11 in.	7½×10 in.	green	
359-17. Tracing Paper,	" "	" "	orange	
318 divisions long side, every 6th line heavy, equivalent to 53 weeks of 6 days each; 200 divisions short side, every 8th line heavy and every 2nd line accented. For charting prices of stock and bonds.				
358-17L. Drawing Paper,	11×16½ in.	10×15 in.	green	
359-17L. Tracing Paper,	" "	" "	orange	



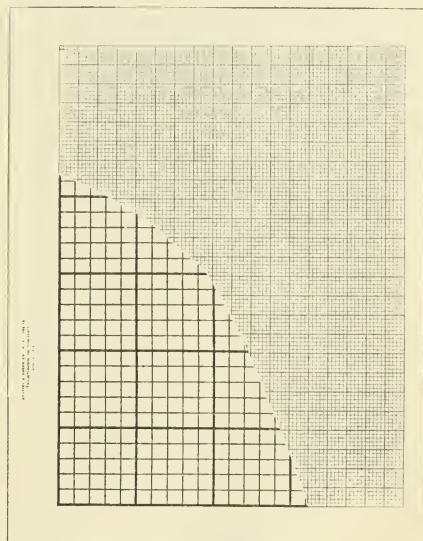
KEUFFEL & ESSER CO., NEW YORK

K & E
GRAPH SHEETS



358-14

359-14G



358-15K



358-17



358-21

KEUFFEL & ESSER CO., NEW YORK

K & E GRAPH SHEETS



358-23



358-25

Size of
Sheet

Size of
Plate

Color of
Lines

6×10 divisions per unit.

318 divisions long side, every 6th line heavy, equivalent to 53 weeks of 6 days each;
200 divisions short side, every 10th line heavy. For charting commodity prices.

358-18L. Drawing Paper, 11×16½ in. 10×15 in. green
For other graph sheets divided 6×10 per unit, see Nos. 358-21, -21L, and 359-21, -21L.

10×12 to 1 in.

10 divisions per inch short side, 5th lines heavy—12 per inch long side, 6th lines heavy.

358-20. Drawing Paper, 8½×11 in. 7×10 in. green
359-20. Tracing Paper, “ “ orange

12×20 to 1 in.

12 divisions per inch long side 6th lines accented, 12th lines heavy—20 per inch
short side, 10th lines heavy.

358-21. Drawing Paper, 8½×11 in. 7×10 in. green
358-21L. Drawing Paper, 11×16½ in. 10×15 in. “
359-21. Tracing Paper, 8½×11 in. 7×10 in. orange
359-21L. Tracing Paper, 11×16½ in. 10×15 in. “

Probability: The Probability scale is based on the normal law of error.

Probability x Logarithmic, 3 cycle, with Probit Scale.

358-22. Drawing Paper, 8½×11 in. 6½×9 in. green
359-22G. Tracing Paper, “ “ orange

Probability x 90 equal divisions, 10th lines heavy.

358-23. Drawing Paper, 8½×11 in. 6½×9¼ in. green
359-23. Tracing Paper, “ “ orange



K & E
GRAPH SHEETS



358-27B



358-29B

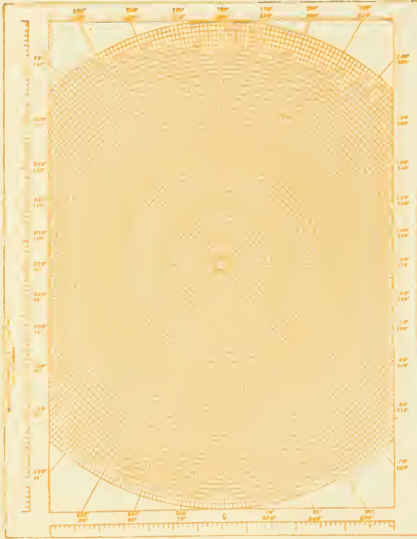


359-28LB

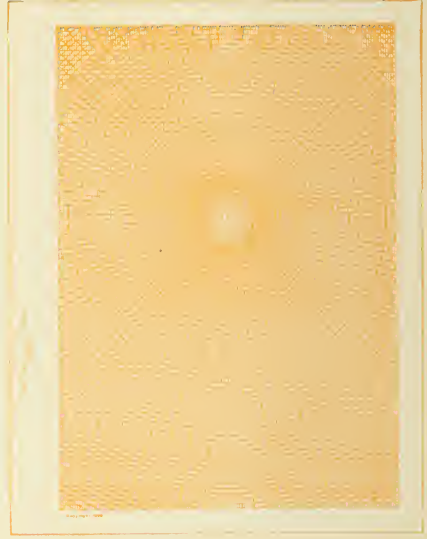
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K & E

GRAPHIC SHEETS



359-31



359-31 1/2

Reciprocal Ruling or Hyperbolic. Reciprocal Ruling on long side,
equal divisions on short side.

For plotting gas and electric rates, and similar purposes. The small sheet has 120 equal divisions, and the large sheet 130, on the short side.

358-25. Drawing Paper,	8 1/2 x 11 in.	7 x 10 in.	green
358-25L. Drawing Paper,	11 x 16 1/2 in.	10 x 15 in.	"
359-25. Tracing Paper,	8 1/2 x 11 in.	7 x 10 in.	orange
359-25L. Tracing Paper,	11 x 16 1/2 in.	10 x 15 in.	"

Perspective.

358-27B. Drawing Paper,	8 1/2 x 11 in.	8 x 10 in.	blue
359-27B. Tracing Paper,	"	"	"

Isometric.

On this paper both isometric and orthographic views may be drawn with equal ease. Isometric scale, 4 x 4 to the inch. Orthographic scale, 8 x 8 to the inch. All inch lines accented.

358-28L. Drawing Paper,	11 x 16 1/2 in.	10 x 15 in.	green
359-28LB. Tracing Paper,	11 x 16 1/2 in.	10 x 15 in.	blue
359-28LG. Tracing Paper,	11 x 16 1/2 in.	10 x 15 in.	green

Has only vertical and 120 degree lines, spaced 1/4 in., with inch lines accented.

358-29B. Drawing Paper,	8 1/2 x 11 in.	7 x 10 in.	blue
359-29B. Tracing Paper,	"	"	"

Isometric-Orthographic.

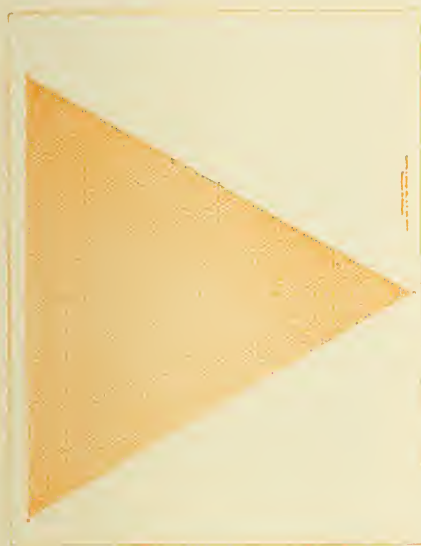
Has horizontal, vertical and 120 degree lines, spaced 1/2 cm.; cm. lines accented.

358-30. Drawing Paper,	8 1/2 x 11 in.	7 x 10 in.	green
359-30. Tracing Paper,	"	"	orange

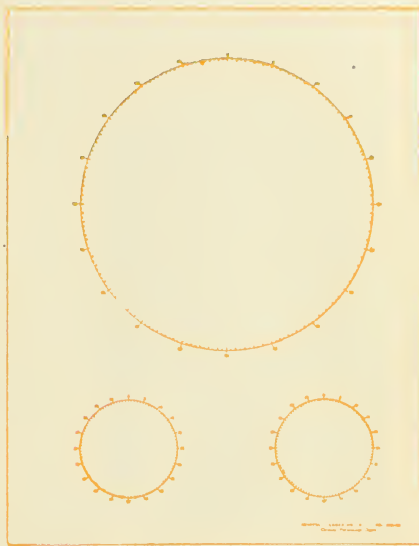
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K & E

GRAPH SHEETS



359-32



359-35

Size of
SheetSize of
PlateColor of
Lines

Hund.

Polar Co-Ordinate.

Divided to single degrees, numbered every 10 degrees in both directions. Ordinates divided to 10 parts to the inch. Outside of main engraving are 2 scales divided to 10 parts to the inch, one on long dimension and one on short dimension.

358-31. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	7×10 in.	green
359-31. Tracing Paper,	"	"	orange
359-31G. " " "	"	"	green

Fluxolite Paper,

For rapidly determining results in lighting problems, as flux determinations, flux in light beams, etc; for mapping space relations between light source and points of illumination; and for point by point method of illumination calculation.

359-31 $\frac{1}{2}$. Tracing Paper,	$8\frac{1}{2} \times 11$ in.	7×10 in.	orange
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Triangular Co-Ordinate.

All 3 dimensions divided into 100 parts, each properly numbered at every 5th division. For plotting a curve composed of 3 variables whose sum is always constant.

358-32. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	Altitude 20 cm.	green
359-32. Tracing Paper,	"	"	orange
359-32G. " " "	"	"	green

Circular Percentage.

3 Circles—one 6 in. dia., circumference divided into 100 divisions, with 2 parts to each division, numbered from 0 to 100; two 2 in. dia., with circumference divided into 100 parts, numbered 0 to 100. For "pie" charts, showing percentages by sectors.

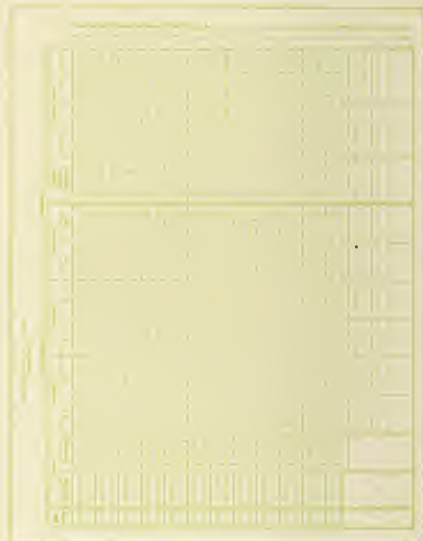
358-35. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	—	green
359-35. Tracing Paper,	"	—	orange

KEUFFEL & ESSER CO., NEW YORK

K & E GRAPH SHEETS



358-40



358-41

Size of
Sheet

Size of
Plate

Color of
Lines

Traverse Sheets

For recording the computations involving the latitudes and departures of the courses.

358-40. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$7\frac{1}{2} \times 10$ in.	green
359-40. Tracing Paper,	"	"	orange

For recording the co-ordinates of the Traverse —
Angle, Bearing, Distance, Northings, Southings, Double Areas, etc.

358-41. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$7\frac{3}{4} \times 9\frac{3}{4}$ in.	green
359-41. Tracing Paper,	"	"	orange

Township Paper

Showing complete township, with sections properly numbered, quarter sections, etc., scale 1 in. = 1 mi.

358-44. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	6×6 in.	black
359-44. Tracing Paper,	"	"	"

Audio Frequency

Semi Logarithmic; Log scale 20 to 20,000 on long side x 10 to the $\frac{1}{2}$ inch, 5th lines accented.

359-46G. Tracing Paper,	$8\frac{1}{2} \times 11$ in.	6×9 in.	green
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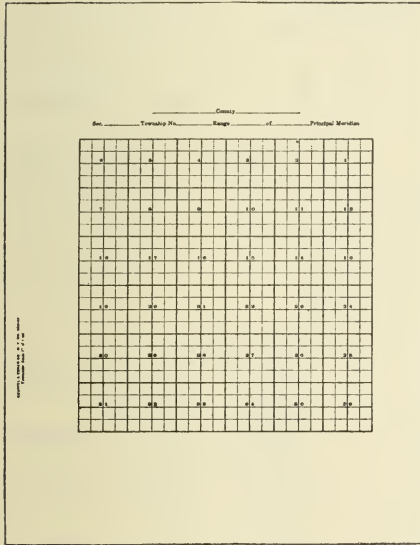
Reactance-Frequency. Standard Graph Sheet, Bell Laboratories.

A logarithmic paper especially designed to solve quickly the relationships between reactance, capacitance, inductance and frequency.

358-47. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$5\frac{3}{4} \times 8$ in.	green
359-47. Tracing Paper,	"	"	orange
359H-47. Heavy Tracing Paper,	"	"	"



K & E GRAPH SHEETS



358-44

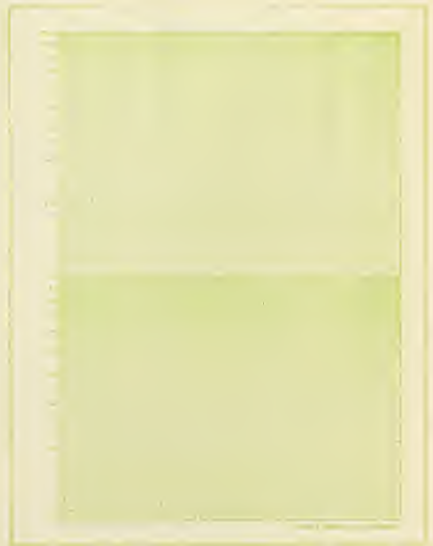
359-44



358-47



358-50



358-60



K & E GRAPH SHEETS

SEMI-LOGARITHMIC

LOGARITHMIC SCALE ONE WAY; UNIFORM SCALE THE OTHER.

LOGARITHMIC SCALES			UNIFORM SCALES				K & E CATALOG NUMBERS		
No. of Log Cycles (Units)	Length of each Cycle in.	Plate Size		Uniform Scale Divisions	Every 5th Line Accented	Drawing Paper Green Ink	TRACING PAPER		
		Log Side in.	Uniform Side in.				Orange Ink	Green Ink	
8½ × 11 Inch Sheet Size.									
1	10	10	×	7	6 to 0.7"	×	358-50	359-50	359-51G
1	10	10	×	7	10 to 1"	×	358-51	359-51	
1	10	10	×	7	6 to ½"		358-52	359-52	
2	5	10	×	7	6 to 0.7"		358-60	359-60	359-61G
2	5	10	×	7	10 to 1"	×	358-61	359-61	
2	5	10	×	7	6 to ½"		358-62	359-62	
2	5	10	×	7	10 to ½"	×	358-63	359-63	359-63G
2	3¾	7½	×	10	10 to ½"	×	358-64	359-64	
3	3⅓	10	×	7	6 to 0.7"		358-70	359-70	
3	3⅓	10	×	7	10 to 1"	×	358-71	359-71	359-71G
3	3⅓	10	×	7	10 to 1"	×	358-71B*	359H-71†	
3	3⅓	10	×	7	6 to ½"		358-72	359-72	
3	3⅓	10	×	7	10 to ½"	×	358-73	359-73	359-81G
4	2½	10	×	7	6 to 0.7"		358-N80	359-N80	
4	2½	10	×	7	10 to 1"	×	358-81	359-81	
4	2	9	×	7	6 to ½"		358-82	359-82	359-91G
5	2	10	×	7	10 to 1"	×	358-91	359-91	
5	1.8	9	×	6	6 to ½"		358-92	359-92	
7	1½	8¾	×	6	5 to 1"		358-96	359-96	
11 × 16½ Inch Sheet Size									
1	10	10	×	15	6 to ½"		358-52L	359-52L	359-61LG
2	5	10	×	15	10 to 1"	×	358-61L		
2	5	10	×	15	6 to ½"		358-62L	359-62L	
3	3⅓	10	×	15	10 to 1"	×	358-71L		359-71LG
3	3⅓	10	×	15	6 to ½"		358-72L	359-72L	
3	3⅓	10	×	15	10 to ½"	×	358-73L	359-73L	
4	2½	10	×	15	10 to 1"	×	358-81L		359-81LG
5	3	15	×	10	6 to 1"		358-94L	359-94L	

* Printed with Blue Ink.

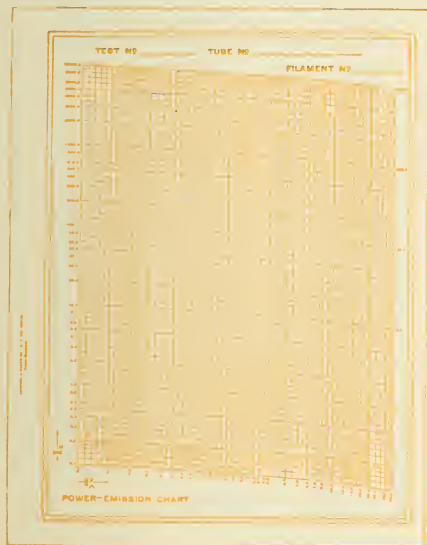
† On Heavy Tracing Paper.

Semi-logarithmic charts are often called "ratio" or "rate of change" or "percentage" charts. When the uniform scale indicates time, the slope of a curve indicates the rate of change in the values shown on the logarithmic scale. See pages 50, 66, 74 and 76 for other semi-logarithmic sheets.



K & E

GRAPH SHEETS



359-98



359-99

Power-Emission.

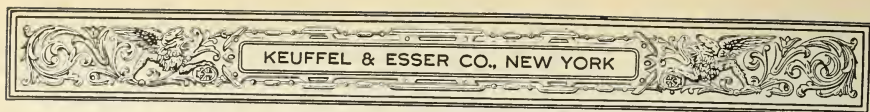
The standard chart of the Institute of Radio Engineers for plating the relation between emission current and filament power of vacuum tubes by extrapolation.

- | | | | | |
|---------|----------------|----------|---|--------|
| 358-98. | Drawing Paper, | 8×11 in. | $6\frac{3}{8} \times 8\frac{3}{16}$ in. | green |
| 359-98. | Tracing Paper, | " | " | orange |

Radio Receiver Performance.

Standard Graph Sheet, Institute of Radio Engineers for graphically indicating the fidelity, sensitivity and selectivity of radio receivers.

- | | | | | |
|---------|----------------|----------|-----------------------------|--------|
| 358-99. | Drawing Paper, | 8×11 in. | $6 \times 8\frac{3}{4}$ in. | green |
| 359-99. | Tracing Paper, | " | " | orange |



K & E
GRAPH SHEETS



358-100
359-100G



358-112



358-120
359-120G



358-127
359-127G

LOGARITHMIC

KEUFFEL & ESSER CO., NEW YORK

K & E GRAPH SHEETS

FULL LOGARITHMIC

LOG SCALES BOTH DIRECTIONS

No. of Log Cycles (Units)	Size of Plate Inches	ON DRAWING PAPER		ON TRACING PAPER	
		Green Ink	Blue Ink	Orange Ink	Green Ink
8½ × 11 Inch Sheet Size					
1 x 1	7½ x 7½	*358-100	358-120B	359-100	*359-100G
1 x 2	5 x 10	358-103		359-103	
2 x 2	7½ x 7½	358-110		359-110	359-110G
2 x 2.7	7½ x 10 ^{3/8}	*358-111		359-111	*359-111G
2 x 3	6 ^{2/3} x 10	*358-112		359-112	
3 x 3	7½ x 7½	*358-120		359-120	*359-120G
3 x 5	5 ^{9/16} x 9 ^{1/4}	*358-125			*359-125G
2.2 x 7	7 x 9½	*358-127			*359-127G
11 × 16½ Inch Sheet Size					
1 x 1	9.85 x 9.85	358-100L		359-100L	
2 x 2	10 x 10	358-110L		359-110L	
2 x 3	10 x 15	358-112L		359-112L	359-112LG
3 x 5	9 x 15	358-125L		359-125L	359-125LG
4 x 7	9½ x 12	358-128L			359-128LG

* See Illustration.

For other Logarithmic Papers see pages 49 and 66.



358-111



359-111G

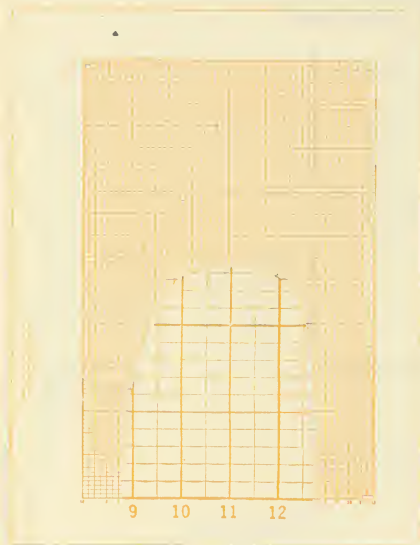
358-125

359-125G

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K & E

GRAPH SHEETS



359-130



359-134

Size of Sheet	Size of Plate	Color of Lines
---------------	---------------	----------------

One Day by Hours.

24 hours by half hours long side, hours numbered; 100 divisions short side, with 10th lines heavy, 5th lines accented.

- | | | | |
|-------------------------|-------------|------------|--------|
| 358-129. Drawing Paper, | 8½ × 11 in. | 7 × 9½ in. | green |
| 359-129. Tracing Paper, | " | " | orange |

24 hours by half hours short side, hours numbered; 100 divisions long side, with 10th lines heavy, 5th lines accented.

- | | | | |
|-------------------------|-------------|-----------|--------|
| 358-130. Drawing Paper, | 8½ × 11 in. | 6 × 9 in. | green |
| 359-130. Tracing Paper, | " | " | orange |
| 359-130 G. " " | " | " | green |

One Week by Hours.

168 divisions short side, with 6th lines heavy; 200 divisions long side, with 10th lines heavy and 5th lines accented.

- | | | | |
|---------------------------|--------------|--------------|--------|
| 358-132 L. Drawing Paper, | 11 × 16½ in. | 10 × 14½ in. | green |
| 359-132 L. Tracing Paper, | " | " | orange |

One Month by Days.

31 divisions short side, numbered 1 to 31; 110 divisions long side, numbered at every 5th division, with 5th lines heavy.

- | | | | |
|-------------------------|-------------|------------|--------|
| 358-134. Drawing Paper, | 8½ × 11 in. | 6 × 9½ in. | green |
| 359-134. Tracing Paper, | " | " | orange |
| 359-134 G. " " | " | " | green |

Weekly-Monthly.

2 Plates, each 5 × 7½ in., divided on short side into 60 parts with 5th lines heavy. One chart divided on long side into 96 parts, with 4th lines heavy; the other into 132 parts with 12th lines heavy.

- | | | | |
|-------------------------|-------------|-----------------|--------|
| 358-136. Drawing Paper, | 8½ × 11 in. | 2 of 5 × 7½ in. | green |
| 359-136. Tracing Paper, | " | " | orange |



K & E

GRAPH SHEETS



358-141L

359-141LG.

Size of
Sheet

Size of
Plate

Color of
Lines

Six Months by Days.

Six calendar months, Jan. to June. Every 5th day numbered and accented; months printed. Divided on short side into 90 parts (10 per inch), with 10th lines heavy and 5th lines accented.

358-137L. Drawing Paper, $11 \times 16\frac{1}{2}$ in. $9 \times 13\frac{5}{8}$ in. green

359-137L. Tracing Paper, " " orange

Six calendar months, July to Dec. Otherwise divided and arranged like 137L.

358-138L. Drawing Paper, $11 \times 16\frac{1}{2}$ in. $9 \times 13\frac{3}{4}$ in. green

359-138L. Tracing Paper, " " orange

Divided on long side, into 6 months of 31 days, with every 5th day numbered. Divided on short side into 120 parts, with each 10th line heavy. Boxes in which names of months can be written or lettered.

358-139. Drawing Paper, $8\frac{1}{2} \times 11$ in. 7×10 in. green

359-139. Tracing Paper, " " orange

One Year by Days.

Any fiscal year. Divided on long side into 372 days; heavy lines between months; every 5th day numbered. Divided on short side into 180 parts (10 per unit) with 10th lines heavy and 5th lines accented.

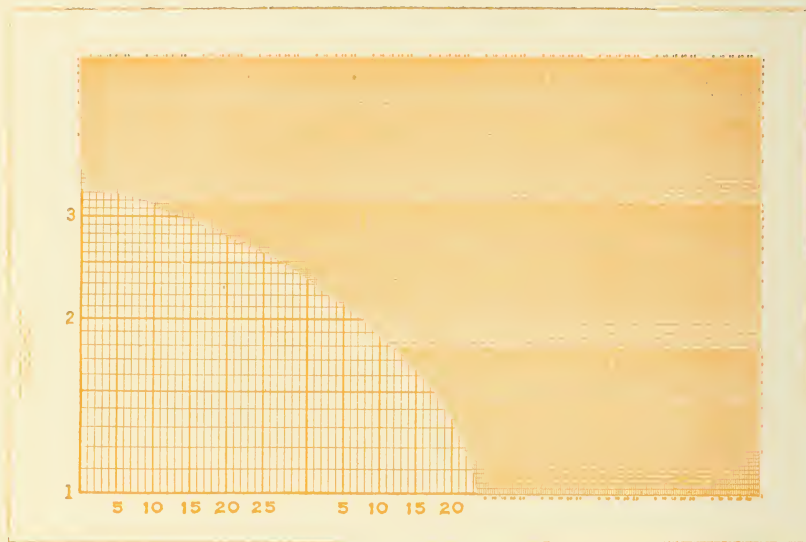
358-140L. Drawing Paper, $11 \times 16\frac{1}{2}$ in. 9×14 in. green

359-140L. Tracing Paper, " " orange

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K & E

GRAPH SHEETS



359-150L

Size of Sheet	Size of Plate	Color of Lines
------------------	------------------	-------------------

One Year by Days (continued)

Calendar Year. Divided on long side into 366 days, with 5th days numbered and months printed. Divided on short side into 150 parts (10 per unit), with 10th lines heavy and 5th lines accented.

358-141 L.	Drawing Paper,	11×16½ in.	7½×14⅝ in.	green
359-141 L.	Tracing Paper,	"	"	orange
359-141LG.	" "	"	"	green

Similar to 141 L, but divided on short side into 250 parts (10 per unit).

358-142.	Drawing Paper,	8½×11 in.	6½×9 in.	green
359-142.	Tracing Paper,	"	"	orange
358-142L.	Drawing Paper,	11×16½ in.	9¾×14⅝ in.	green
359-142L.	Tracing Paper,	"	"	orange

Similar to 141 L, but divided on short side into 300 parts (8 per unit) with 8th lines heavy and 4th lines accented.

358-143L.	Drawing Paper,	11×16½ in.	9×14 in.	green
359-143L.	Tracing Paper,	"	"	orange

Divided and marked on long side like 140 L. Three 3 in. Log Scales short side.

358-150L.	Drawing Paper,	11×16½ in.	9×14 in.	green
359-150L.	Tracing Paper,	"	"	orange

Divided and marked on long side like 141 L. Three 3 in. Log Scales short side.

358-151 L.	Drawing Paper,	11×16½ in.	9×14 in.	green
359-151 L.	Tracing Paper,	"	"	orange



K & E GRAPH SHEETS



358-160



358-170

Size of Sheet	Size of Plate	Color of Lines
------------------	------------------	-------------------

One Year by Weeks.

Divided on short side into 52 parts with 13th lines ($\frac{1}{4}$ year) heavy, and on long side into 180 parts, with 10th lines heavy and 5th lines accented.

358-160. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 9$ in.	green
359-160. Tracing Paper,	“	“	orange

One Year by Months.

Divided on short side into 12 parts, with names of months in 12 parts; divided on long side into 150 parts with 10th lines heavy and numbered.

358-170. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 8$ in.	green
359-170. Tracing Paper,	“	“	orange

Similar to 170 but months running the long side of the paper. Divided on short side into 100 parts, with 10th lines heavy and numbered.

358-171. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 9\frac{1}{2}$ in.	green
359-171. Tracing Paper,	“	“	orange

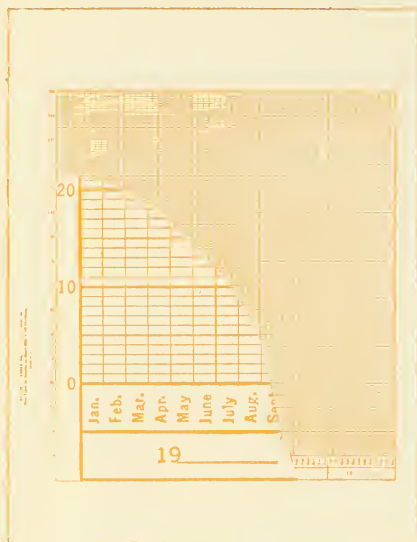
Similar to 170, but has three 3 in. Log scales long side.

358-175. Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 9\frac{1}{2}$ in.	green
359-175. Tracing Paper,	“	“	orange

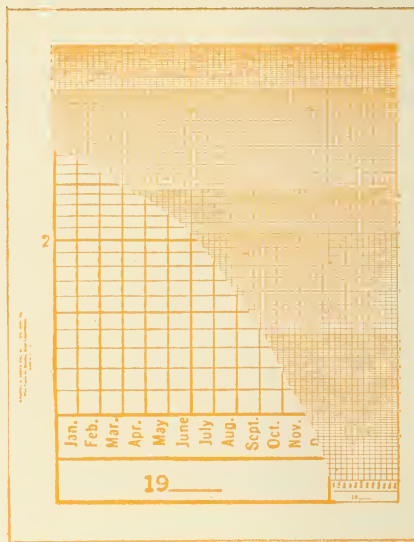


K & E

GRAPH SHEETS



359-190



359-195

Size of
Sheet

Size of
Plate

Color of
Lines

Three Years by Months.

Divided on short side into 36 parts, and on long side into 100 parts with 5th lines heavy and 10th lines numbered. Months marked. Spaces for years.

358-180.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	6×9 in.	green
359-180.	Tracing Paper,	"	"	orange

Five Years by Months.

Divided on short side into 60 parts, and on long side into 150 parts with 10th lines heavy and numbered. Months marked. Spaces for years.

358-190.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	7×8 in.	green
359-190.	Tracing Paper,	"	"	orange

Similar to 190, but months running long way of paper. Divided on short side into 100 parts, 10th lines heavy and numbered.

358-192.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 10$ in.	green
358-192L.	" "	$11 \times 16\frac{1}{2}$ in.	$9\frac{1}{2} \times 14$ in.	"
359-192.	Tracing Paper,	$8\frac{1}{2} \times 11$ in.	$6\frac{1}{2} \times 10$ in.	orange
359-192L.	" "	$11 \times 16\frac{1}{2}$ in.	$9\frac{1}{2} \times 14$ in.	"

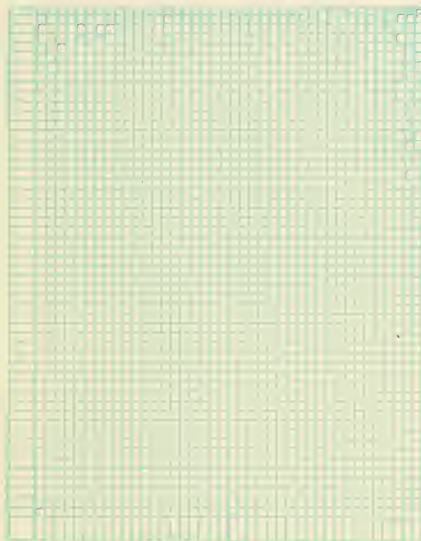
Similar to 190, but three 3 in. Log scales long side.

358-195.	Drawing Paper,	$8\frac{1}{2} \times 11$ in.	18×24 cm.	green
359-195.	Tracing Paper,	"	"	orange



K & E

GRAPH SHEETS



358-221.

Size of Sheet	Size of Plate	Color of Lines
------------------	------------------	-------------------

Ten Years by Months.

Divided on long side into 120 parts and on short side into 110 parts with 10th lines heavy and numbered. Months marked. Spaces for years.

358-200L. Drawing Paper,	$11 \times 16\frac{1}{2}$ in.	$9\frac{3}{4} \times 14$ in.	green
359-200L. Tracing Paper,	“	“	orange
359-200LG. “ “	“	“	green

Similar to 200 L, but three 3 in. Log scales on short side.

358-205 L. Drawing Paper,	$11 \times 16\frac{1}{2}$ in.	$9\frac{1}{2} \times 14$ in.	green
359-205 L. Tracing Paper,	“	“	orange

Twenty Years by Months.

Divided on long side into 240 parts, with months Mar., June, Sept. and Dec. printed throughout. Divided on short side into 110 parts with 10th lines heavy and numbered.

358-210L. Drawing Paper,	$11 \times 16\frac{1}{2}$ in.	$9\frac{3}{4} \times 14$ in.	green
359-210L. Tracing Paper,	“	“	orange

Divided and marked on long side like No. 210L. Two 4.625 in. Log scales on short side.

358-214L. Drawing Paper,	$11 \times 16\frac{1}{2}$ in.	$9\frac{3}{4} \times 14$ in.	green
359-214L. Tracing Paper,	“	“	orange

Divided and marked on long side like No. 210L. Three 3.1 in. Log scales on short side

358-215L. Drawing Paper,	$11 \times 16\frac{1}{2}$ in.	$9\frac{3}{4} \times 14$ in.	green
359-215L. Tracing Paper,	“	“	orange



K & E

GRAPH SHEETS



358-230



358-240

		Size of Sheet	Size of Plate	Color of Lines
Ruled Papers.				
358-220.	Drawing Paper,	8½×11 in.	Lines only, ruled blue.	
358-221.	“ “	“	5×5 per in., ruled blue, 5th lines heavy.	
Plain Papers.				
358-226.	Drawing Paper,	8½×11 in.	Blank	
359-226.	Tracing Paper,	“	“	

General Data Sheet

Divided into 7 columns on the short side and into 43 spaces for headings, figures and totals on the long side, with a clear space of $3\frac{3}{4}$ in. below the engraving for notes.

358-230. Drawing Paper, $8\frac{1}{2} \times 11$ in. $7 \times 7\frac{3}{16}$ in. green

Monthly Data Sheet Printed on Both Sides

Divided into 10 columns on the long side, with the names of the months in separate columns at the right and left. Three separate sections of 12 months, each with extra spaces for headings and totals on the short dimension. Each face of the sheet has the complete engraving as above described

358-240. Drawing Paper, $8\frac{1}{2} \times 11$ in. $7\frac{1}{4} \times 10$ in. green



K & E

GRAPH SHEETS



358-260

Trig Function Data Sheet

For trigonometry, analytic geometry. (polar co-ordinate) and calculus. Tables give values of principal trigonometric functions and of radians for intervals of 15° around the entire circle. Blank spaces for additional data.

		Size of Sheet	Color of Lines
358-260.	Drawing Paper,	$8\frac{1}{2}$ x 11 in.	green



ATLAS TIME RECORD AND EXPENSE SHEET

REG. U. S. PAT. OFF.

- 396.** Atlas Time Record and Expense Sheet, size of sheet $5\frac{3}{4} \times 9$ in. for keeping a correct, simple and rapid record of the time spent on any work. 82 sheets with paper cover.

No.		NAME	
YEAR		MONTH	
	DATE	DESCRIPTION OF WORK	NOTES
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			

"ATLAS" TIME RECORD Published by KEUFFEL & ESSER CO., NEW YORK

CRESCENT CERTIFICATE BOOK

TRADE MARK

No. CRESCENT CERTIFICATE BOOK CONTRACTOR FOR BUILDING Am't Certificate \$ Previously Paid \$ Total to Date \$ Am't Contract \$ Extra Work \$	CERTIFICATE NO. \$ To Contractor for Entitled to the Payment of Dollars as per Contract Am't Previously Paid \$ Amount of Contract \$ Extra Work \$ REFLECT ON OTHER SIDE
--	--

- 397-1.** Crescent Certificate Book, size of sheet $3\frac{1}{4} \times 9$ in., 100 sheets in linen cover, with imprint of customer's name; in lots of 2.
397-2. do. without imprint

STANDARD DOCUMENTS

OF THE AMERICAN INSTITUTE OF ARCHITECTS.

- 399 A.** Agreement and General Conditions, in cover.
399 B. Owner's Protective Bond.
399 C. Form of Sub-contract.
399 D. Letter of Acceptance of Sub-contractor's Proposal.
399 E. Standard form of Agreement between Owner and Architect on the percentage Basis.
399 S. Complete Set, one of each of 399A to 399E incl.

KEUFFEL & ESSER CO., NEW YORK

PHOTACT

REG. U. S. PAT. OFF.

REPRODUCTION PAPERS, CLOTHS AND FILMS FOR CONTACT PRINTING

PHOTACT materials for contact printing are the complete answer to a great variety of reproduction needs. They are invaluable, not only in the drafting room for reproducing original ink or pencil drawings, but also in the general business and professional fields for making clear, readable copies of sketches and layouts, printed or typewritten letters, documents and records of all kinds.

These PHOTACT materials include:

1. PHOTACT CONTACT PAPERS, on which can be printed
 - (a) dense negatives from originals
 - (b) good, readable positives from negatives.
2. PHOTACT CONTACT TRANSPARENT TRACING PAPERS and CLOTHS on which ink-intense positives can be printed from PHOTACT negatives or any good negative. These positives can, in turn, be used to make unlimited quantities of further reproductions as described below. The surface of these PHOTACT Contact Transparent Papers and Cloths can be worked over in pencil or ink. The original reproduced lines and added ink or pencil lines can be erased.
3. PHOTACT CONTACT FILMS, both transparent and opaque.

PHOTACT CONTACT PAPERS

Because of their pick-up properties, negatives made on PHOTACT papers are unusually dense, even though the originals may be relatively poor. Furthermore, when necessary, these negatives can be retouched. For this reason they result in equally strong legible positives, whether the positives are made on these same papers or on PHOTACT Transparent Tracing Papers or Cloths.

PHOTACT CONTACT TRANSPARENT PAPERS AND CLOTHS

There are many uses for PHOTACT Contact Transparent (tracing) Papers and Cloths in the industrial drafting room. The following are a few of their outstanding features and advantages.

1. *To preserve valuable original drawings.* With continual handling and printing, these become worn, soiled or damaged. To replace them with new tracings costs time and money. Instead, they need be used just once, to make a PHOTACT negative, and then filed away

(continued)

for safekeeping. From this negative, positive reproductions of ink-like intensity can be made on PHOTACT Transparent Paper or Cloth. These, in turn, can be used to make as many blueprints, brownprints, or HELIOS dry developed positive line prints as may be required.

2. *To furnish additional ink-like reproductions of the original drawing to departments or sub-contractors.* From these reproductions they can make as many blueprints, brownprints or HELIOS dry developed positive line prints as they need.
3. *To eliminate cost in time and expense of making ink tracings of pencil drawings.* Ink-intense reproductions of pencil originals on PHOTACT Transparent Cloth give the approximate equivalent of an ink tracing in a fraction of the time.
4. *To provide strong, ink-intense reproductions of original drawings that have been damaged by age or wear and from which it might be possible to make only indifferent reproductions on materials other than PHOTACT papers and cloths.*

PRINTING AND DEVELOPING

PHOTACT Contact Papers and Cloths can be safely handled in a dim light. They do not require a dark room. The sensitivity to light of their emulsion, however, is such that they should not be printed in the powerful arc illumination of a blueprint machine, but in equipment illuminated with fluorescent or incandescent lights.

For the reproduction of large drawings a continuous copier, or a large vacuum box is recommended. For smaller drawings an office copy box may be used.

After exposure in the printer, PHOTACT Contact Papers and Cloths are treated by a simple photographic process. This is:

1. Development with No. N425 PHOTACT Developer.
2. Short stop.
3. Fixing with No. N427 PHOTACT Fixer.
4. Water bath.
5. Drying.

Complete directions will be furnished on request.

REPRODUCTION SERVICE

All K & E branch houses and most K & E distributors have modern reproduction plants, where reproductions of all kinds including PHOTACT, HELIOS and DUPRO can be made. Information regarding prices for this service and the location of the nearest of such plants will be sent on request.

KEUFFEL & ESSER CO., NEW YORK

PHOTACT

REG. U. S. PAT. OFF.

CONTACT PAPERS

PHOTACT Contact Paper No. 401 meets a wide range of reproduction needs, not only in the drafting room, but in all kinds of business and professional offices as well. This paper is used to make regular contact or reflex negatives from original ink or pencil drawings, sketches, layouts, printed or typewritten letters, contracts, business or legal documents and records of any sort. These negatives are then used to make positive reproductions on PHOTACT Papers or Cloth or on other reproduction materials. Also for positive reproductions from negatives.

MEDIUM — Weight No. 26. (105 grams.)

401D. ROLLS 20 yards long, in the following widths:
24 in. 30 in. 36 in. 40 42 in.

401X. ROLLS 50 yards long, in the following widths:
24 in. 30 in. 36 in. 40/42 in.

SHEETS Sizes as ordered.

THIN — Weight No. 22. (85 grams.)

401TD. ROLLS 20 yards long, in the following widths:
24 in. 30 in. 36 in. 40/42 in.

401TX. ROLLS 50 yards long, in the following widths:
24 in. 30 in. 36 in. 40/42 in.

SHEETS Sizes as ordered.

KEUFFEL & ESSER CO., NEW YORK

PHOTACT CONTACT PAPER

REG. U. S. PAT. OFF.

(CONTINUED)

EXTRA THIN — Weight No. 15. (55 grams.)

This Extra Thin paper is much more transparent than the Medium and Thin weights. For this reason it is well adapted for negatives from which blue line prints on blueprint paper can be made, or for positives to make blueprints, brownprints or HELIOS positive prints.

401ETD.	ROLLS	20 yards long, in the following widths:	
		30 in.	36 in. 40/42 in.
401ETX.	ROLLS	50 yards long, in the following widths:	
		30 in.	36 in. 40/42 in.

SHEETS Sizes as ordered.

PHOTACT CARD STOCK CONTACT PAPER

For positive reproductions when a heavy card stock suitable for filing or other special purposes is required.

HEAVY — Weight 240 grams.

*401CSD.	ROLLS	20 yards long, in the following widths:	
		30 in.	36 in. 40/42 in.

SHEETS Sizes as ordered.


PHOTACT DUPLEX CONTACT PAPER

Reproductions can be made on both sides of this paper as the base stock is opaque. It is primarily used for positive reproductions of such items as documents and instruction manuals where subject matter is to be reproduced on opposite sides of the same sheet.

HEAVY — Thickness approx. .009 in. Weight 135 grams.

*401-2D.	ROLLS	20 yards long, in the following widths:	
		30 in.	40/42 in.

SHEETS Sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

PHOTACT ALBANIZED

REG. U. S. PAT. OFF.

TRADE MARK

CONTACT TRANSPARENT PAPER

100% high grade rag stock, transparentized with an inert synthetic solid; prints on this paper will not deteriorate nor change color with age. Intended principally for duplicates of drawings as described on pages 81 and 82; can also be used for negatives.

405D. ROLLS 20 yards long, in the following widths:
30 in. 36 in. 40/42 in.

405X. ROLLS 50 yards long, in the following widths:
30 in. 36 in. 40/42 in.

SHEETS Sizes as ordered.

PHOTACT ALBANIZED CONTACT TRANSPARENT PAPER WATERPROOFED

100% high grade rag stock, transparentized with an inert synthetic solid and waterproofed; paper will not deteriorate nor change color with age. Used for reproductions when close adherence to original dimensions is important; both for negative prints from originals and for duplicates of originals from negatives.

407D. ROLLS 20 yards long and 40/42 in. wide.

SHEETS Sizes as ordered.

PHOTACT CONTACT TRACING CLOTH

A high grade waterproofed tracing cloth either blue or white, used for tracing cloth duplicates of drawings (from negatives).

BLUE

410D. ROLLS 20 yards long, in the following widths:
30 in. 36 in. 42 in.

410X ROLLS 50 yards long, in the following widths:
30 in. 36 in. 42 in.


SHEETS Sizes as ordered.

WHITE

410WD. ROLLS 20 yards long, in the following widths:
30 in. 36 in. 42 in.

410WX. ROLLS 50 yards long, in the following widths:
30 in. 36 in. 42 in.

SHEETS Sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

PHOTACT CONTACT FILMS

REG. U. S. PAT. OFF.

TRANSPARENT FILM

For highly transparent negatives or positives. For increased dimensional stability.

414. ROLLS 50 feet long, in the following widths:-
20 in. 30 in. 40/42 in.
414. ROLLS 100 feet long, in the following widths:-
20 in. 30 in. 40/42 in.
- *414. SHEETS Sizes as ordered.

WHITE OPAQUE FILM

- *414-3. ROLLS 50 feet long, 40/42 in. wide.
- *414-3. ROLLS 100 feet long, 40/42 in. wide.
Other sizes to order only.
- *414-3. SHEETS Sizes as ordered.

PHOTACT CONTACT GLASS CLOTH

The base of this dimensionally stable material is the same as that of the No. 147 STABILENE Glass Cloth. It is coated with a chloride emulsion for contact printing.

- *421. SHEETS Sizes as ordered.

PHOTACT DEVELOPER

FOR CONTACT PAPERS AND CLOTHS

- N425G. PHOTACT Developer, for making 1 gallon of developer solution — with directions.
- N425V. PHOTACT Developer, for making 5 gallons of developer solution — with directions.


PHOTACT FIXER

FOR CONTACT PAPERS AND CLOTHS

- N427G. PHOTACT Fixer, for making 1 gallon of fixing solution — with directions.
- N427V. PHOTACT Fixer, for making 5 gallons of fixing solution — with directions.

PRINTERS

See pages 184 to 188 for a description of printers which are especially suited for use with PHOTACT materials.


 KEUFFEL & ESSER CO., NEW YORK

PHOTACT PROJECTION REG. U. S. PAT. OFF. REPRODUCTION MATERIALS

The papers and cloths listed below are similar to PHOTACT contact materials but carry an extra-sensitive emulsion suitable for projection printing.

Prints are generally made on PHOTACT projection papers and cloths from film or glass plate negatives which in turn have been reproduced from the original drawings. PHOTACT prints made by this process have qualities similar to those possessed by PHOTACT (contact) prints.

PHOTACT projection materials find many uses for the production of prints from photographic negatives which have been made from drawings on opaque materials such as drawing papers or metal templates.

Because of the extra sensitivity of the PHOTACT projection emulsion, these materials must be handled in a dark room illuminated by red safety lights. Developing is accomplished by immersion in a developer, short stop, hypo and water bath. Complete directions will be furnished for the handling of this material on request.

PHOTACT ALBANIZED TRADE MARK PROJECTION TRANSPARENT PAPER

Like No. 405 but with an extra-sensitive emulsion for projection printing. This paper must be handled in a dark room (red light only.)

415D. ROLLS 20 yards long and 40/42 in. wide.
 SHEETS Sizes as ordered.

PHOTACT ALBANIZED PROJECTION TRANSPARENT PAPER WATERPROOFED

Like No. 407 but with an extra-sensitive emulsion for projection printing. This paper must be handled in a dark room (red light only.)

417D. ROLLS 20 yards long and 40/42 in. wide.
 SHEETS Sizes as ordered.

PHOTACT PROJECTION TRACING CLOTH

Like No. 410 and No. 410W but with an extra-sensitive emulsion for projection printing. This cloth must be handled in a dark room (red light only.)

 BLUE
420D. ROLLS 20 yards long, in the following widths:
 *30 in. *36 in. 42 in.

 WHITE
420WD. ROLLS 20 yards long, in the following widths:
 *30 in. *36 in. 42 in.
 SHEETS Sizes as ordered.

KEUFFEL & ESSER CO., NEW YORK

DUPRO REPRODUCTION TRACING CLOTH

REG. U. S. PAT. OFF.

DUPRO reproduction tracing cloth is a waterproof tracing cloth coated with a special light-sensitive emulsion. Finished DUPRO reproductions are black line copies of the original drawing or tracing and consequently may be employed for exactly the same purposes as the original tracing.

DUPRO reproductions are generally made on DUPRO reproduction tracing cloth by exposing it in a blue print machine or vacuum frame behind a Maduro brown print negative (any other type negative may of course be used) made from the tracing which is to be reproduced. After exposure the cloth is washed in running water (preferably under pressure) developed in DUPRO developer and washed again in running water. Because the DUPRO emulsion has approximately the same sensitivity as medium speed blueprint paper it may be safely handled in the light found in the average blue print room.

BLUE

430.	ROLLS	10 yards long, and in the following widths:			
		30 in.	36 in.	42 in.	*54 in.
430D.	ROLLS	20 yards long, and in the following widths:			
		30 in.	36 in.	42 in.	*54 in.
	SHEETS	Sizes as ordered.			

WHITE

430W.	ROLLS	10 yards long, and in the following widths:			
		30 in.	36 in.	42 in.	*54 in.
430WD.	ROLLS	20 yards long, and in the following widths:			
		30 in.	36 in.	42 in.	*54 in.
	SHEETS	Sizes as ordered.			

DUPRO DEVELOPER

430-10.	DUPRO Developer, sufficient to make 3 gallons of solution, to develop approximately 50 yards.
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*To order only.



MADURO BROWNPRINT PAPERS AND CLOTHS

REG. U. S. PAT. OFF.

The MADURO materials listed below and on the following pages are coated with a solution which after exposure and development produces an opaque brown-black.

All of these materials may be printed on any standard blueprint machine or on a vacuum frame illuminated with arc lights.

Development is accomplished by thoroughly washing the exposed print in running water and then immersing it in a solution made from No. 438S MADURO Fixing Salt. A quantity of this salt and directions are furnished with each roll.

Because of the opaqueness of the background of MADURO prints they are principally used in the lighter weight as negatives from which positive blue line or brown line, PHOTACT or DUPRO prints are made.

MADURO ALBANIZED TRANSPARENT TRADE MARK BROWNPRINT PAPER


The base stock of this paper is 100% high grade rag, transparentized with an inert synthetic solid which gives it a very high degree of transparency. The transparentizer used contains no oil likely to leak out into the developing baths or any substance that will cause the paper to deteriorate or change color with age.

Because of its high transparency, this paper is especially useful for negative prints from which blue line prints on blueprint paper can be made, or for positives to make blueprints, brownprints, HELIOS positive prints, PHOTACT or DUPRO positive prints. It is also well suited for positive replicas from which blueprints or other reproductions can be made.

Weight No. 14.

432TN.	ROLLS	10 yards long, in the following widths:		
		30 in.	36 in.	42 in.
432TNX.	ROLLS	50 yards long, in the following widths:		
		30 in.	36 in.	42 in.

NOTE—A sufficient amount of No. 438S MADURO Fixing Salt is furnished with every shipment of the above MADURO brownprint paper.


 KEUFFEL & ESSER CO., NEW YORK

MADURO BROWNPRINT PAPERS

REG. U. S. PAT. OFF.

The base stock of these papers is 100% high grade rag and possesses considerable strength so that it will withstand much handling.

MADURO PAPER — THIN

Weight No. 14.

No. 436TN is used principally for negatives from which blue line, brown line, PHOTACT, DUPRO or other positive prints can be produced. It is also suitable for positive prints made from negatives.

436TN.	ROLLS	10 yards long, in the following widths:			
		30 in.	36 in.	42 in.	54 in.
436TNX.	ROLLS	50 yards long, in the following widths:			
		30 in.	36 in.	42 in.	54 in.

MADURO PAPER — MEDIUM

Weight No. 24.

No. 436M is used principally for positive brown line prints made from negatives.

436M.	ROLLS	10 yards long, in the following widths:			
		30 in.	36 in.	42 in.	54 in.
436MX.	ROLLS	50 yards long, in the following widths:			
		30 in.	36 in.	42 in.	54 in.

NOTE — A sufficient amount of No. 438S MADURO Fixing Salt is furnished with every shipment of the above MADURO brownprint papers.

MADURO BROWNPRINT CLOTHS

MADURO CLOTH — THIN

Frequently used for negatives which are to undergo considerable rough handling.

438L.	ROLLS	10 yards long, in the following widths:			
		30 in.	36 in.	42 in.	
438LX.	ROLLS	50 yards long, in the following widths:			
		30 in.	36 in.	42 in.	

MADURO CLOTH — THICK

Generally used for positive brown line prints made from negatives. Will withstand rough handling; useful for outdoor work.

438.	ROLLS	10 yards long, in the following widths:			
				42 in.	54 in.
438X.	ROLLS	50 yards long, in the following widths:			
				42 in.	54 in.

NOTE — A sufficient amount of No. 438S MADURO Fixing Salt is furnished with every shipment of the above MADURO brownprint cloths.

KEUFFEL & ESSER CO., NEW YORK

BLUEPRINT PAPERS & CLOTHS

K & E blueprint papers and cloths have been developed over a period of many years to the high standard quality which they now possess. The raw papers are made to strict specifications and each lot is tested in the K & E humidity and temperature controlled testing laboratory to make certain that it meets these specifications.

The solutions used on these materials have all been developed in our laboratory and will be found to be particularly well suited for large scale production of blueprints by modern blueprint equipment.

Careful control of the chemicals used in these solutions, repeated laboratory checks of each solution batch and uniform humidity conditions in the coating room guarantee the production of solutions with the uniform printing characteristics which are of such vital importance in the modern blueprint establishment.

SPECIAL AIR MAIL

STOCK

PRINTING SPEED

— 100% clean white rags.

— Regularly coated in speeds 3 and 64. Other speeds "to order only" in minimum quantities of 500 yards and over of a Speed and Width. Speed No. 3, recommended for Export, has good keeping quality and is excellent for sun frame printing.

SPECIAL AIR MAIL—Weight No. 14.

442TN. ROLLS 10 yards long, in the following widths:
30 in. 36 in. 42 in.

442TNX. ROLLS 50 yards long, in the following widths:
30 in. 36 in. 42 in.

SHEETS Sizes as ordered.

PARCHMINE

TRADE MARK

EACH ROLL WATERMARKED "PARCHMINE. 100% RAG."

STOCK

PRINTING SPEED

— 100% clean white rags.

— Available in printing speeds for every purpose. For use in sun frames and medium speed blueprint machines we recommend speed 35.

PARCHMINE — Weight No. 17.

443ET. ROLLS 10 yards long, in the following widths:
24 in. 30 in. 36 in. 42 in. 54 in.

443ETX. ROLLS 50 yards long, in the following widths:
24 in. 30 in. 36 in. 42 in. 54 in.

SHEETS Sizes as ordered.

PARCHMINE — Weight No. 24.

443M. ROLLS 10 yards long, in the following widths:
24 in. 30 in. 36 in. 42 in. 54 in.

443MX. ROLLS 50 yards long, in the following widths:
24 in. 30 in. 36 in. 42 in. 54 in.

SHEETS Sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

BLUEPRINT PAPERS

(CONTINUED)

CHALLENGE "EIGHTY"

TRADE MARK

Prints made on this new type paper are much clearer and more legible than prints on ordinary blueprint papers. The white lines are more vivid and the background is a deeper, more intense blue.

STOCK — 50% high grade rag.

PRINTING SPEED — The following speeds of the No. 444 CHALLENGE "EIGHTY" print at approximately the speeds of the No. 445 CHALLENGE as shown:

No. 444	No. 445
83	25
85	64 and 35
87	66
89	68

CHALLENGE "EIGHTY" — Weight No. 17.

444T. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in.

444TX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in.

SHEETS Sizes as ordered.

CHALLENGE "EIGHTY" — Weight No. 20½.

444L. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

444LX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

SHEETS Sizes as ordered.

CHALLENGE "EIGHTY" — Weight No. 24.

444M. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

444MX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

SHEETS Sizes as ordered.



BLUEPRINT PAPERS (CONTINUED)

CHALLENGE

TRADE MARK

EACH ROLL WATERMARKED "CHALLENGE 50%".

STOCK — 50% high grade rag.

PRINTING SPEED — Available in printing speeds for every purpose. For use in sun frames and medium speed blueprint machines we recommend speed 35.

CHALLENGE — Weight No. 17.

445T. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in.

445TX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in.

SHEETS Sizes as ordered.

CHALLENGE — Weight No. 20½.

445L. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

445LX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

SHEETS Sizes as ordered.

CHALLENGE — Weight No. 24.

445M. ROLLS 10 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

445MX. ROLLS 50 yards long, in the following widths:
24 in. 27 in. 30 in. 36 in. 42 in. 48 in. 54 in.

SHEETS Sizes as ordered.

BLUEPRINT CLOTHS COLUMBIA

TRADE MARK

PRINTING SPEED All orders furnished with a special coating 2C. Suitable for blueprint machine or sun frame use.

COLUMBIA — Thin.

A finely woven cloth for map prints and purposes requiring minimum shrinkage and distortion.

452. ROLLS 10 yards long, in the following widths:
30 in. 36 in. 42 in.

452X. ROLLS 50 yards long, in the following widths:
30 in. 36 in. 42 in.

SHEETS Sizes as ordered.

COLUMBIA — Thick.

Because of its strength, it is preferred for prints intended for rough handling, especially in outdoor work.

453. ROLLS 10 yards long, in the following widths:
30 in. 36 in. 42 in. 54 in.

453X. ROLLS 50 yards long, in the following widths:
30 in. 36 in. 42 in. 54 in.



HELIOS

TRADE MARK ®

DRY DIAZO, POSITIVE PRINTING PAPERS, CLOTHS, FILMS

HELIOS Dry Diazo, Positive Line Reproduction Papers, Cloths and Films are the result of development and research in the K & E laboratories over a period of several years. The introduction of the HELIOS line to the market was withheld until tests fully proved that the K & E quality goal had been reached.


A special K & E chemical plant has been developed, representing a considerable investment, to produce the chemicals essential to the preparation of HELIOS products. The possession of this plant means that K & E is independent of outside sources of supply for these chemicals. This self-sufficient freedom of manufacture makes possible a rigid and consistent safeguarding of standards and quality, which might otherwise be beyond control.

The HELIOS line offers a wide variety of papers, cloths and films not only for the production of regular working prints, but for a variety of reproduction requirements as well.

Positive line working prints are made on HELIOS opaque papers or cloth directly from transparent originals. HELIOS transparent intermediate originals, made directly from the originals on HELIOS transparent papers, cloth or films, can be used in place of the originals to make working prints: 1. To preserve the originals, which can be safely filed away, 2. To make drawing changes (instead of making these on the originals), 3. To speed up production when a quantity of working prints are needed, 4. To make composite prints by overlays.

HELIOS Papers can be printed in a standard blueprint machine and developed in a separate ammonia type developer, or they can be printed and developed in any of the combination ammonia print machines on the market.

HELIOS Positive Prints can be made with greater speed and economy than blueprints. No water bath is used in the HELIOS Process. No drying equipment is needed. The developer is applied to HELIOS Papers in the form of a vapor. It is not liquid. Consequently no distortion occurs in the process of developing. They are much more true to scale than blueprints or other prints that require liquid developing processes.


 KEUFFEL & ESSER CO., NEW YORK
HELIOS

TRADE MARK ®

DRY DIAZO, POSITIVE PRINTING**OPAQUE PAPERS****BLACK LINE, 50% RAG**

No.	Weight No.	Speed	10 YARD ROLLS					50 YARD ROLLS				
			24 in.	30 in.	36 in.	42 in.	54 in.	24 in.	30 in.	36 in.	42 in.	54 in.
470T.	17	5 & 7	✓	✓	✓	✓						
470TX.	17	5 & 7						✓	✓	✓	✓	
470L.	20½	5 & 7	✓	✓	✓	✓	✓					
470LX.	20½	5 & 7						✓	✓	✓	✓	✓
470M.	24	5 & 7	✓	✓	✓	✓	✓					
470MX.	24	5 & 7						✓	✓	✓	✓	✓

SHEETS— Sizes as ordered.

BLUE LINE, 50% RAG

No.	Weight No.	Speed	10 YARD ROLLS					50 YARD ROLLS				
			24 in.	30 in.	36 in.	42 in.	54 in.	24 in.	30 in.	36 in.	42 in.	54 in.
471T.	17	5,7 & 9	✓	✓	✓	✓						
471TX.	17	5,7 & 9						✓	✓	✓	✓	
471L.	20½	5,7 & 9	✓	✓	✓	✓	✓					
471LX.	20½	5,7 & 9						✓	✓	✓	✓	✓
471M.	24	5,7 & 9	✓	✓	✓	✓	✓					
471MX.	24	5,7 & 9						✓	✓	✓	✓	✓

SHEETS — Sizes as ordered.



HELIOS

TRADE MARK ®

DRY DIAZO, POSITIVE PRINTING

OPAQUE PAPERS *(continued)*

BLACK LINE

No.	Weight No.	Speed	10 YARD ROLLS					50 YARD ROLLS				
			24 in.	30 in.	36 in.	42 in.	54 in.	24 in.	30 in.	36 in.	42 in.	54 in.
480L.	20½	5 & 7	√	√	√	√	√					
480LX.	20½	5 & 7						√	√	√	√	√
480H.	32	5		√	√	√						
480HX.	32	5						√	√	√		
* 480H-2.	32	5		√	√	√						
* 480H-2X.	32	5						√	√	√		
‡ 480CS.	64	5		√	√	√						
‡ 480CSX.	64	5						√	√	√		

SHEETS — Sizes as ordered.

BLUE LINE

No.	Weight No.	Speed	10 YARD ROLLS					50 YARD ROLLS				
			24 in.	30 in.	36 in.	42 in.	54 in.	24 in.	30 in.	36 in.	42 in.	54 in.
481L.	20½	5, 7 & 9	√	√	√	√	√					
481LX.	20½	5, 7 & 9						√	√	√	√	√
481H.	32	5		√	√	√						
481HX.	32	5						√	√	√		
* 481H-2.	32	5		√	√	√						
* 481H-2X.	32	5						√	√	√		
‡ 481CS.	64	5		√	√	√						
‡ 481CSX.	64	5						√	√	√		

SHEETS — Sizes as ordered

MAROON LINE

No.	Weight No.	Speed	10 YARD ROLLS					50 YARD ROLLS				
			24 in.	30 in.	36 in.	42 in.	54 in.	24 in.	30 in.	36 in.	42 in.	54 in.
482L.	20½	5	√	√	√	√	√					
482LX.	20	5						√	√	√	√	√

SHEETS — Sizes as ordered.

KEUFFEL & ESSER CO., NEW YORK

HELIOS

TRADE MARK ®

DRY DIAZO, POSITIVE PRINTING

ALBANIZED TRANSPARENT PAPER

TRADE MARK

For intermediate originals used to replace originals, to make drawing changes (instead of on the originals), to speed up production of working prints in quantity.

This paper is transparentized with an inert synthetic material (developed for ALBANENE Tracing Paper). These are its outstanding features: 1. Erasures of imagelines can actually be made with a soft ink or typewriter eraser, 2. Fine printing transparency means running off working prints at high speeds, 3. Intensity and covering power of line, 4. Visual transparency, 5. Strength and weight for easy handling in the printer, 6. Pencil and ink changes can be made on either side.

SEPIA LINE, 100% RAG

No.	10 YARD ROLLS			50 YARD ROLLS		
	30 in.	36 in.	42 in.	30 in.	36 in.	42 in.
N493.	✓	✓	✓			
N493X.				✓	✓	✓

SHEETS — Sizes as ordered.

HELIOS

DRY DIAZO, POSITIVE PRINTING

NATURAL TRANSPARENT PAPERS

These are unprepared tracing papers, with 100% high grade rag content. They are intended for intermediate originals in which the special features offered by the No. N493 HELIOS Albanized transparent paper are not required. Made in two styles, single and double coated. The double coated paper gives better covering power of line, which results in the production of better working prints from these intermediate originals.


SEPIA LINE, 100% RAG—SINGLE COATED

No.	10 YARD ROLLS				50 YARD ROLLS			
	24 in.	30 in.	36 in.	42 in.	24 in.	30 in.	36 in.	42 in.
437.	✓	✓	✓	✓				
497X.					✓	✓	✓	✓

SEPIA LINE, 100% RAG—DOUBLE COATED

No.	10 YARD ROLLS				50 YARD ROLLS			
	24 in.	30 in.	36 in.	42 in.	24 in.	30 in.	36 in.	42 in.
498.	✓	✓	✓	✓				
498X.					✓	✓	✓	✓

SHEETS — Sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

HELIOS

TRADE MARK ®

DRY DIAZO, POSITIVE PRINTING

ACETATE SAFETY FILMS

SEPIA LINE

For intermediate originals when originals have weak pencil lines or are worn and soiled. For composite prints of drawings, maps, plans, charts, designs, layouts. For drawing changes or additions in ink or pencil (No. 511 and 511H only).

CLEAR FILM. This is a transparent cellulose acetate safety film, with both surfaces clear. It is recommended whenever no drawing changes or additions are needed. When furnished in sheets, the notch at the top right means that the upper surface is the sensitized side. In rolls, the sensitized side is the inner surface.

No.	Gauge	10 YARD ROLLS		20 YARD ROLLS	
		36 in.	42 in.	36 in.	42 in.
510.	.005"	✓	✓		
510D.	.005"			✓	✓

SHEETS — Sizes as ordered.

MATTE FILM. This is a transparent cellulose acetate safety film, with one matte surface. This matte surface takes pencil or ink, for drawing changes or additions, or for strengthening the image lines. The glossy side is impregnated with the coating solution.

No.	Gauge	10 YARD ROLLS		20 YARD ROLLS	
		36 in.	42 in.	36 in.	42 in.
511.	.005"	✓	✓		
511D.	.005"			✓	✓
511H.	.0075"	✓	✓		
511HD.	.0075"			✓	✓

SHEETS — Sizes as ordered.

HELIOS


DRY DIAZO, POSITIVE PRINTING

OPAQUE PAPER, PLASTIC SURFACE

BLACK LINE

An opaque, plastic surface paper, sensitized one side. For special factory prints or other reproductions required for long service, for use on bulletin boards, in reference books or exposure to dust and dirt. Readily cleaned by wiping the surface with a damp cloth.

514. SHEETS only, sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

HELIOS TRADE MARK ® **DRY DIAZO, POSITIVE PRINTING CLOTHS**

OPAQUE CLOTHS (White)

For working prints that are needed for harder or longer wear, to withstand rougher handling than would normally be given to opaque paper prints.

BLACK LINE

No.	10 YARD ROLLS			20 YARD ROLLS			50 YARD ROLLS		
	30 in.	36 in.	42 in.	30 in.	36 in.	42 in.	30 in.	36 in.	42 in.
515.	✓	✓	✓						
515D.				✓	✓	✓			
515X.							✓	✓	✓

SHEETS — Sizes as ordered.

BLUE LINE

No.	10 YARD ROLLS			20 YARD ROLLS			50 YARD ROLLS		
	30 in.	36 in.	42 in.	30 in.	36 in.	42 in.	30 in.	36 in.	42 in.
516.	✓	✓	✓						
516D.				✓	✓	✓			
516X.							✓	✓	✓

SHEETS — Sizes as ordered.

TRACING CLOTH (Blue)

A fine quality cloth, for intermediate originals, combining these important features: 1. Image lines can be erased with soft ink or typewriter eraser, 2. Specially treated surface makes it moisture-proof, preventing loss of transparency during development or subsequent handling, 3. Unusually high re-printing transparency, 4. Great intensity and covering power of line for reprints, 5. Visual transparency, for reverse reading prints, 6. Ink or pencil can be used on either side.

SEPIA LINE

No.	10 YARD ROLLS				20 YARD ROLLS				50 YARD ROLLS			
	30 in.	36 in.	42 in.	54 in.	30 in.	36 in.	42 in.	54 in.	30 in.	36 in.	42 in.	54 in.
518.	✓	✓	✓	✓								
518D.					✓	✓	✓					
518X.									✓	✓	✓	

SHEETS — Sizes as ordered.


 KEUFFEL & ESSER CO., NEW YORK

HELIOS

TRADE MARK®

DRY DIAZO, POSITIVE PRINTING

GLASS CLOTH

SEPIA LINE

The base of this dimensionally stable material is the same as that of the No. 147 STABILENE Glass Cloth. It is coated with a sepia line HELIOS emulsion.

* 520. SHEETS Sizes as ordered.

ERASING FLUIDS

FOR

HELIOS PRINTS

The following table shows the K & E ERASING FLUIDS that should be used for various types of HELIOS PRINTS.

<u>HELIOS Print</u>	<u>Erasing Fluid</u>
470	3030
471	3030
480	3030
481	3030
482	3030
N493	3033 or N3031
497	N3031
498	N3031
510	N3031
511	N3031
515	3030
516	3030
518	3033

3030. Erasing Fluid. Set of three 1 oz. bottles.

N3031. Erasing Fluid. Set of two 1 oz. bottles.

3033. Erasing Fluid. 1 oz. bottle.

KEUFFEL & ESSER CO., NEW YORK

MINUSA

REG. U. S. PAT. OFF.

DRAWING INSTRUMENTS

MINUSA Drawing Instruments are designed by K & E engineers and made in the K & E factory at Hoboken, N. J. They are outstanding for their construction, performance and wearing qualities. They are of tapering, round leg design, easy to manipulate and well balanced.

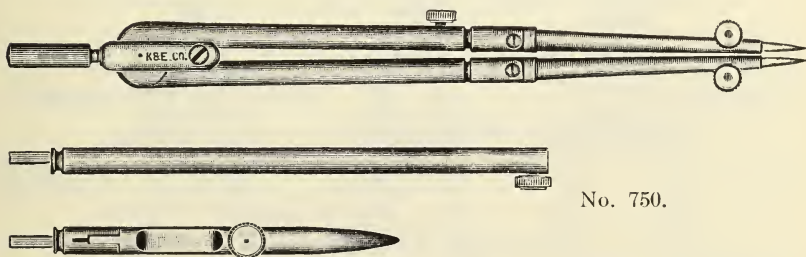
The knuckles or bearing plates at the top of the dividers are formed by cold shaping the metal of the leg, which hardens and strengthens this important part. The smooth, easy action will not vary. The knee joints of the compasses are of taper screw construction and maintain the proper friction without looseness. The pen, pencil lead holder and lengthening bar are held in perfect alignment and rigidity. In the ringhead bow instruments the outward thrust is provided entirely by the ringhead, which, like a leaf spring, combines flexibility with strength and uniform pressure on the adjusting screws in all positions.



No. 748.

748. HAIRSPRING DIVIDERS, $5\frac{3}{4}$ in.

One leg split and adjustable with a slow motion screw, by means of which exact spacing can be easily made.



No. 750.

750. COMPASSES, 6 in. Includes adjustable needle point, pen, pencil lead holder, and lengthening bar.

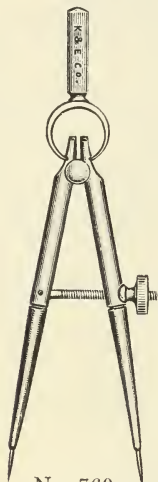
759. LEAD BOX, containing 3 leads.

KEUFFEL & ESSER CO., NEW YORK

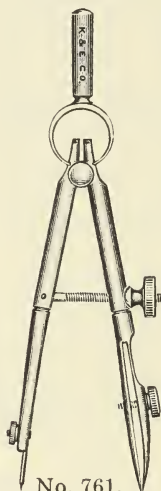
MINUSA

REG. U. S. PAT. OFF.

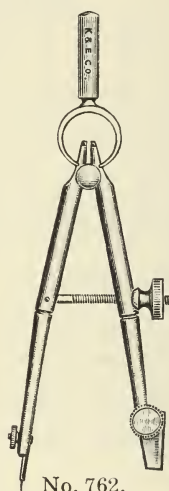
BOW INSTRUMENTS



No. 760.



No. 761.

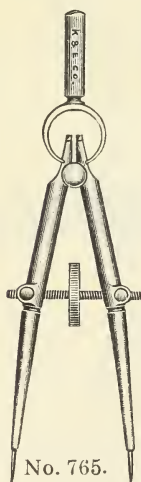


No. 762.

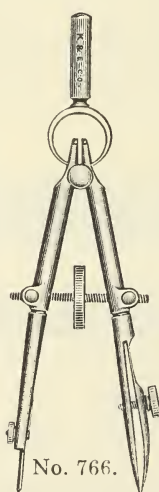
760. RINGHEAD BOW DIVIDERS, $3\frac{3}{4}$ in.

761. RINGHEAD BOW PEN, $3\frac{3}{4}$ in.

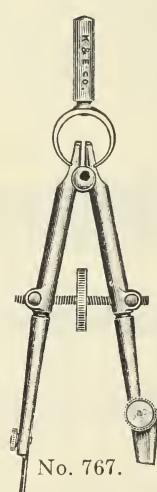
762. RING HEAD BOW PENCIL, $3\frac{3}{4}$ in.



No. 765.



No. 766.



No. 767.

765. RINGHEAD BOW DIVIDERS, with central thumbscrew, $3\frac{3}{4}$ in.

766. RINGHEAD BOW PEN, with central thumbscrew, $3\frac{3}{4}$ in.

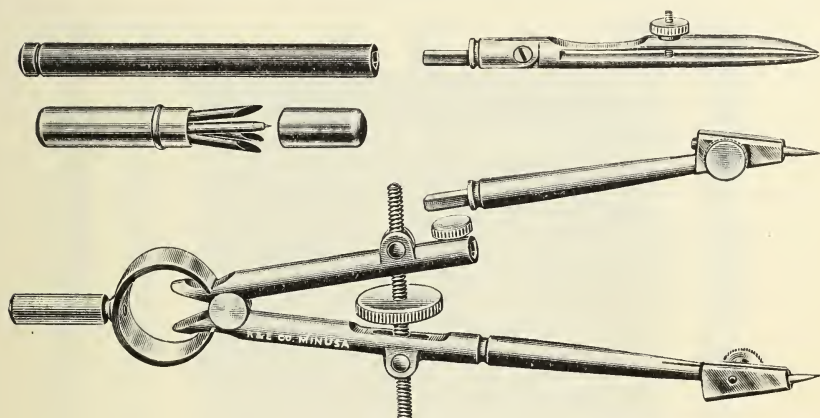
767. RINGHEAD BOW PENCIL, with central thumbscrew, $3\frac{3}{4}$ in.

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BOW INSTRUMENT COMBINATION



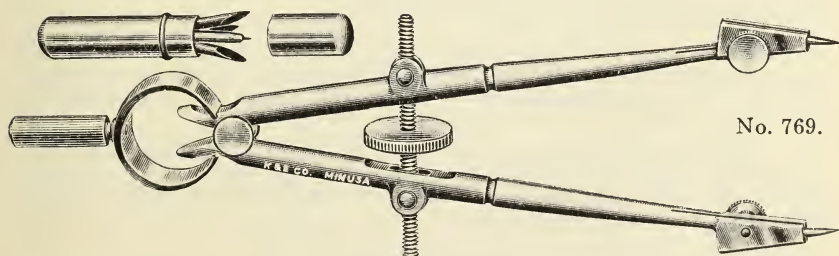
No. 768.

This combination includes a large 6 in. bow compasses with central thumb adjustment. It has one stiff leg with an adjustable needle holder. The other leg is jointed to carry pen or pencil lead holder. The pen has a knee joint. The pencil holder may be used to hold a needle point. A pen handle is provided which can be push-fitted to the pen to make an excellent ruling pen.

This bow instrument has a wide range of utility, since it shares with all bow instruments the ability to make very small circles, yet it is large enough to make circles of considerable size. Pencil circles range from $\frac{1}{16}$ in. to $9\frac{1}{2}$ in. in diameter, pen circles from $\frac{3}{32}$ in. to 9 in.

768. BOW INSTRUMENT COMBINATION.

Includes one 6 in. ringhead bow compasses with pen and pencil legs, pen holder and lead case with leads and needle.



No. 769.

769. RINGHEAD BOW PENCIL, 6 in. with central thumbscrew.

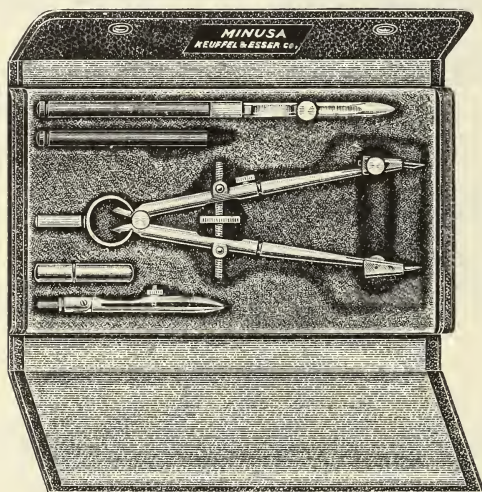
This bow pencil is similar to No. 768 except that the pencil leg is not detachable; lead case with leads and needle included.

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MINUSA

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BOW INSTRUMENT SET



No. 768-2.

Built around the idea of making a minimum number of instruments perform a maximum variety of services to the draftsman, this set accomplishes its purpose in a highly satisfactory way, for **MINUSA** quality is maintained. The draftsman or student may well prefer this abbreviated set of quality instruments, to a complete set of inferior construction.

The set includes a large 6 in. bow compasses with central thumbscrew adjustment. It has one stiff leg with an adjustable needle holder. The other leg is jointed to carry pen or pencil lead holder. The pen has a knee joint. The pencil holder may be used to hold a needle point.

A ruling pen No. 774 is provided and in addition the set includes one pen handle which may be push-fitted to the compass pen to make an additional ruling pen. Thus the draftsman has available at the same time, one ruling pen and one pen compasses; or if he prefers, two ruling pens.

This bow instrument has a wide range of utility, since it shares with all bow instruments the ability to make very small circles, yet it is large enough to make circles of considerable size. Pencil circles range from $\frac{1}{16}$ in. to $9\frac{1}{2}$ in. in diameter; pen circles from $\frac{3}{32}$ to 9 in.

768-2. MINUSA BOW INSTRUMENT SET.

Includes one 6 in. ringhead bow compasses, with pen and pencil legs; one No. 774 **MINUSA** ruling pen; pen holder; lead case with three leads and two taper pointed dividers needles; in leatherite covered, velveteen lined pocket case, 4x7x1 in. overall.

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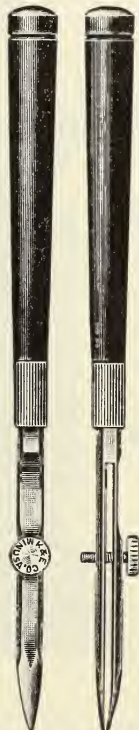
RULING PENS



No. 772.



No. 774.



No. 774T.

Both materials and workmanship are of the utmost importance in producing a ruling pen of excellence. The steel used for the pen itself must have permanent springing quality to maintain pressure against the screw head; it must be well tempered to take a fine knife edge point; and it must be hard enough to resist wear and maintain long intervals between sharpenings.

In meeting these specifications, MINUSA ruling pens are made of a specially selected high grade tool steel of hexagonal stock which is machined and heat treated under scientifically controlled conditions. They are capable of drawing exceptionally fine, smooth, even-feeding lines with a minimum of wear. A handle in a rich burgundy color, and a metal ferrule completes an assembly with which it is a pleasure to work.

772. RULING PEN, upper blade with spring, $4\frac{1}{2}$ in.

774. RULING PEN, “ “ “ “ $5\frac{1}{2}$ in.

774T. RULING PEN, $5\frac{1}{2}$ in. with tapered handle.

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DRAWING INSTRUMENTS

REPAIR PARTS

No. 779



779- 1



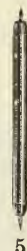
2 Needle for dividers.



3 Fork Screw for compasses and dividers.



4 Adjusting Nut for compass pen.



5 Needle for compasses.



6 Clamp Screw for holding compass needle and pencil lead.



779- 7



7a Clamp Screw for lengthening bar.



8 Needle for bow dividers.



9 Adjusting Nut for small bow pen.



10 Clamp Screw for small bow pencil.



11 Clamp and Nut for small bow pen and pencil needles.

12 Needle for small bow pen and pencil.



13



14



15



16



17

779 13

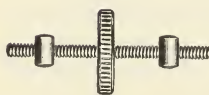
Adjusting Screw Assembly for small side operated bow instruments.

14 Roller Pivot for small bow instruments.

15 Adjusting Screw for large ruling pen.

16 Adjusting Screw for small ruling pen.

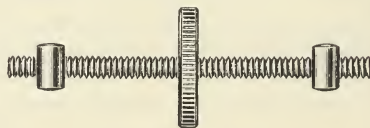
17 Fork Spring for compasses and dividers.



18



19



20



21

779-18

Screw and Nut Assembly for small central thumbscrew bow instruments.

19 Roller Pivot for large bow instruments.

20 Adjusting Screw Assembly for large bow instruments.

21 Clamp Screw for large bow instruments.

22 Needle for large bow instruments.

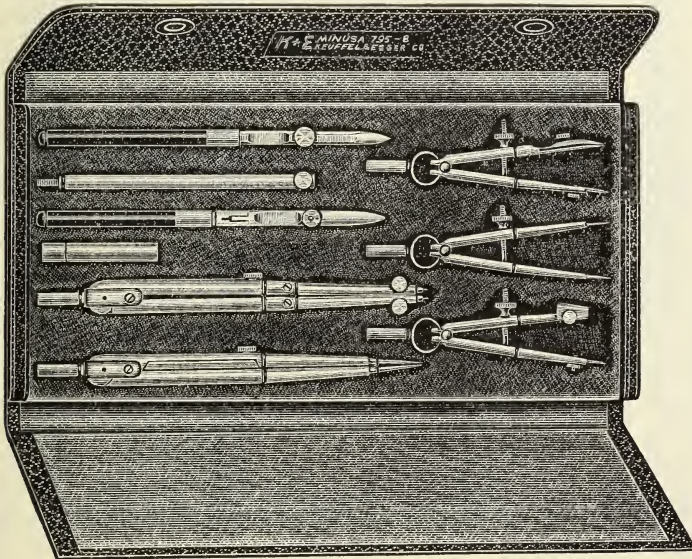


MINUSA

REG. U. S. PAT. OFF.

DRAWING SET

ROLLED NICKEL SILVER



No. 795-8.

795-8. MINUSA DRAWING SET, in leatherite case, containing:

- 1 No. 748 Hairspring Dividers, $5\frac{3}{4}$ in.
- 1 No. 750 Compasses, 6 in.
- 1 No. 760 Bow Dividers, $3\frac{3}{4}$ in. side operated.
- 1 No. 761 Bow Pen, $3\frac{3}{4}$ in. side operated.
- 1 No. 762 Bow Pencil, $3\frac{3}{4}$ in. side operated.
- 1 No. 774 Ruling Pen, $5\frac{1}{2}$ in.
- 1 No. 759 Lead Box, containing 3 leads.
- 1 Pen Handle, which, when fitted to compass pen, provides a second ruling pen.

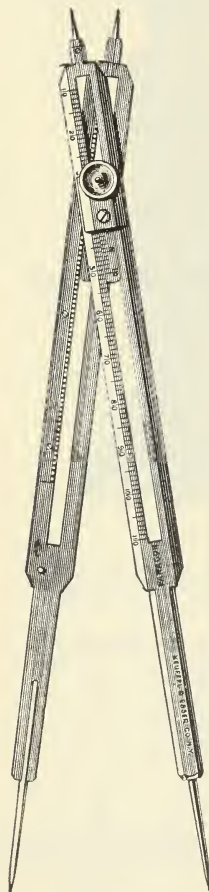
KEUFFEL & ESSER CO., NEW YORK

PARAGON

TRADE MARK®

PROPORTIONAL DIVIDERS

806X. UNIVERSAL Proportional Dividers, 10 in., steel parts of stainless steel, with Rack Movement which greatly facilitates setting, in Morocco finish Case, with Table of Settings.



No. 806X.

UNIVERSAL Proportional Dividers No. 806X differs from the
TRADE MARK®

ordinary instrument of its kind in that its whole length is divided into 200 equal parts, which are further subdivided into tenths by means of a vernier. These graduations are not carried over the entire length of the instrument because those seen in the figure, from 10 to 110 reading with the vernier to 1000ths, are practically all that are necessary for the almost endless variety of purposes to which these Dividers may be applied. By this method of graduation any desired ratio between 1:1 and 1:11.5 may be set off. Thus, setting 483 (taken from many others in a table of settings which accompanies each instrument) gives the ratio between the diameter and the circumference of a circle; in other words, when the slide is set to this number by means of the vernier, the opening at one end will take in the diameter of a circle, and the opening between the points of the other end gives at once its circumference reduced to lineal measure. In like manner, settings can be made for such ratios as the diameter of a circle and the side of an equal square, feet and meters, yards and meters, etc. The list of settings for Lines, Planes and Solids, inclosed with each instrument, is much more complete than the series of fixed graduations on the usual Proportional Dividers. The setting of the slide from such a table is effected more easily and more accurately than can be done by the ordinary method. By means of the fully graduated scale, very small departures from a given ratio can be detected at once.

Any other desired setting not found in the list may be obtained by means of a very simple formula given with the table of settings.

Universal Proportional Dividers No. 806X has adjustable stainless steel points which can be re-pointed without affecting the correctness of the instrument.

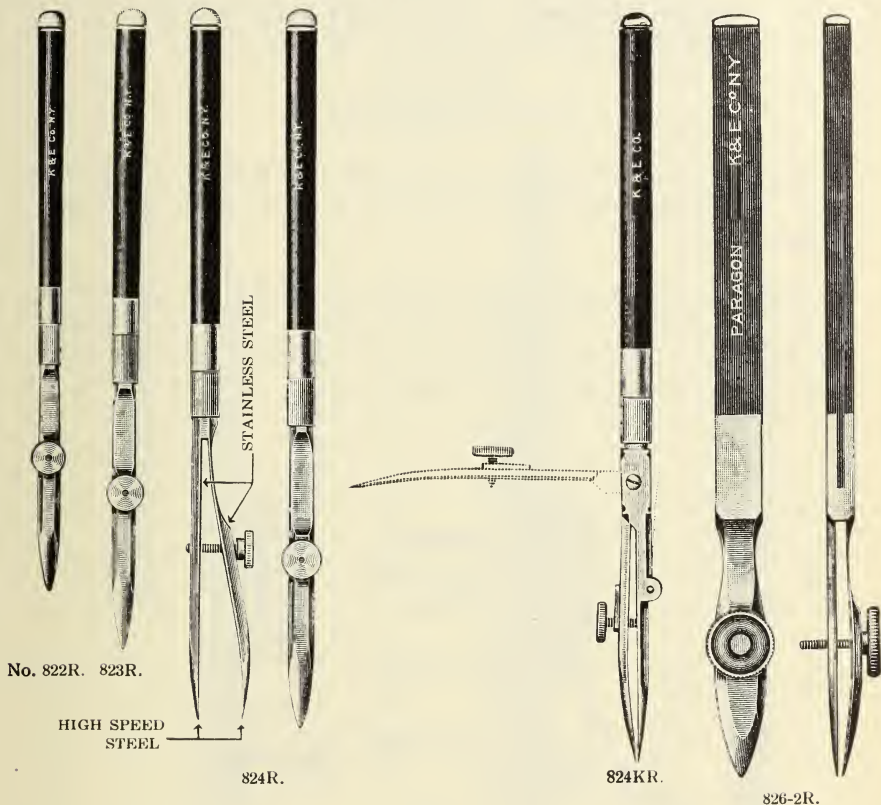
KEUFFEL & ESSER CO., NEW YORK

PARAGON WYTETIP "R"

TRADE MARK ®

TRADE MARK

RULING PENS



PARAGON WYTETIP "R" Ruling Pens are made with points of high speed steel butt-welded to blades of stainless steel. They can be identified by the white tip at the end of the handle and by the letter "R" stamped on the outside of the lower blade.

822R.	PARAGON WYTETIP "R"	Ruling Pen, upper blade with spring,	4½ in.
823R.	"	"	5 "
824R.	"	"	5½ "
822KR.	Knife Spring PARAGON WYTETIP "R"	Ruling Pen,	4½ in.
823KR.	"	"	5 "
824KR.	"	"	5½ "

The Knife Spring PARAGON Pens have a hinged upper blade worked by a spring similar to that in a pocket knife. It either holds the pen open at 90 degrees or presses it firmly against the fixed blade. Opening the pen for cleaning does not change the adjustment for width of line.

826-2R. PARAGON WYTETIP "R" Detail Pen, upper blade with spring, flat handle, 6 in.

KEUFFEL & ESSER CO., NEW YORK

ANVIL

TRADE MARK

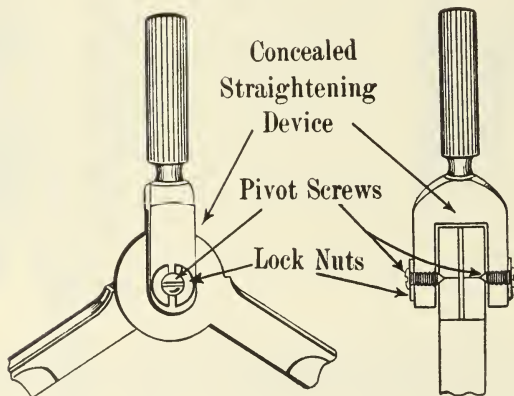
DRAWING INSTRUMENTS

SQUARE TYPE

ROLLED NICKEL SILVER

ANVIL Instruments are durable and serviceable instruments at a moderate price. They are made of hard rolled nickel silver and fine steel, and are well finished and fitted.

Compasses and Dividers. The heads have pivot joints with lock nuts as shown in the illustration. This type of head construction combines simplicity and durability with handsome appearance. These instruments are fitted with a simple and durable straightening device.



The knee joints of the compasses are fitted with steel plates, which reduce wear and friction and promote smoothness of operation.

Steelspring Bows. These are made of a single piece of high grade steel.

Drawing Pens. These are of the superior hexagonal type. The points are carefully ground to the form demanded by expert draftsmen, tempered to the proper degree of hardness, and finely sharpened.

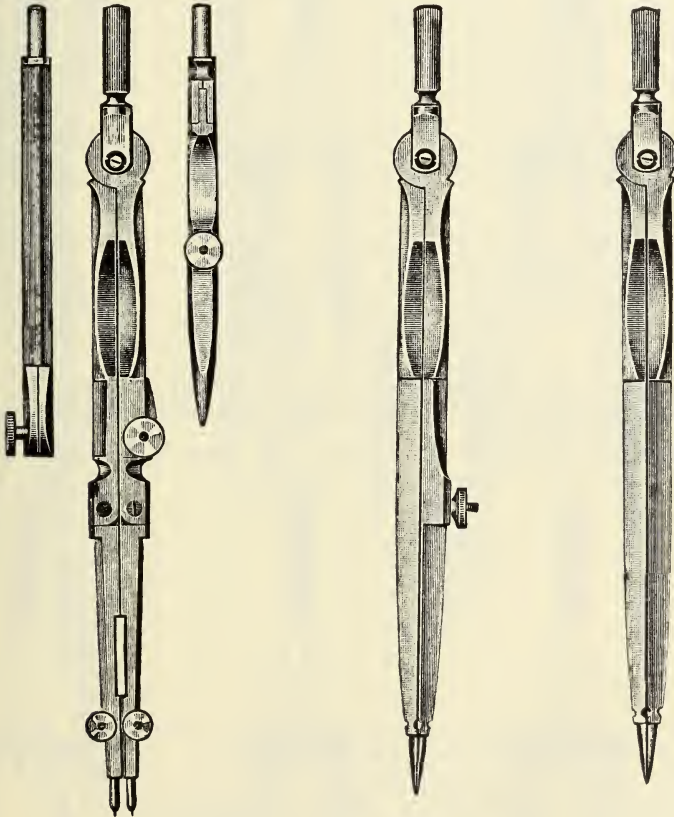
KEUFFEL & ESSER CO., NEW YORK

ANVIL

TRADE MARK

DRAWING INSTRUMENTS

SQUARE TYPE



No. 900.

No. 903.

No. 904.

900. Compasses. 6½ in., with straightening device, fixed needle point, pen, pencil point and lengthening bar.

903. Hairspring Dividers, with straightening device, 6 in.

904. Plain Dividers, with straightening device, 6 in.

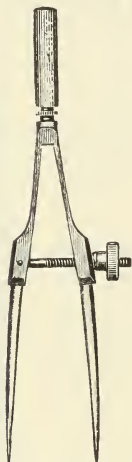
KEUFFEL & ESSER CO., NEW YORK

ANVIL

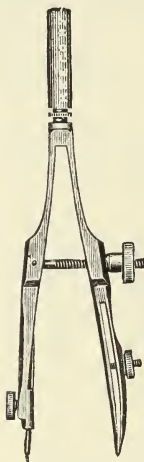
TRADE MARK

DRAWING INSTRUMENTS

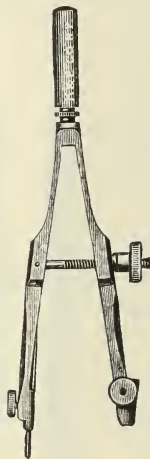
SQUARE TYPE



No. 910.



No. 911.

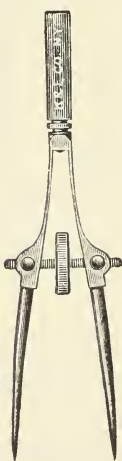


No. 912.

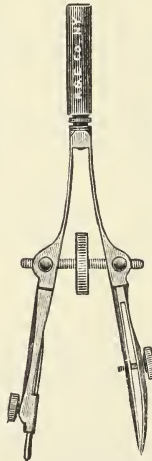
910. Steelspring Bow Dividers, $3\frac{1}{2}$ in., nickel silver handle.

911. Steelspring Bow Pen, $3\frac{1}{2}$ in., with spring blade and needle point, nickel silver handle.

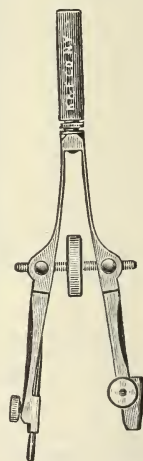
912. Steelspring Bow Pencil, $3\frac{1}{2}$ in., with needle point, nickel silver handle.



No. 915.



No. 916.



No. 917.

915. Steelspring Bow Dividers, $3\frac{1}{2}$ in., with central thumbscrew, nickel silver handle.

916. Steelspring Bow Pen, $3\frac{1}{2}$ in., with spring blade and with central thumbscrew, nickel silver handle.

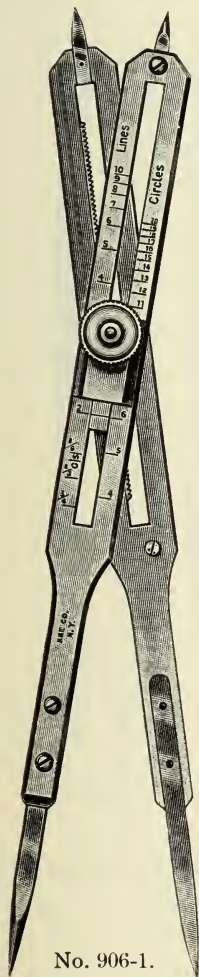
917. Steelspring Bow Pencil, $3\frac{1}{2}$ in., with central thumbscrew, nickel silver handle.

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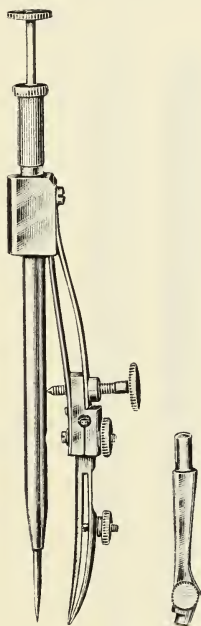
ANVIL

TRADE MARK

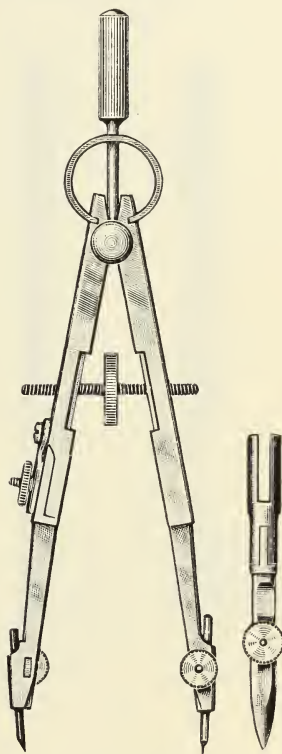
DRAWING INSTRUMENTS



No. 906-1.



No. 914.



No. 918.

906-1. Proportional Dividers, $7\frac{1}{2}$ in., divided for lines (from $\frac{3}{4}$ to 10) and circles* (from 4 to 20), with replaceable steel points, with Rack Movement which greatly facilitates setting.

* The scale of circles provides a means by which the circumference of any circle within the scope of the instrument can be rapidly divided into from 4 to 20 equal parts.

906-1C. Proportional Dividers, No. 906-1 in leatherite covered case with velvet lining.

914. Drop Bow Pen and Pencil, pen with spring blade, $4\frac{1}{2}$ in.

918. Ringhead Bow Combination, $5\frac{1}{2}$ in., central thumbscrew, with pen and pencil legs, nickel silver legs and handle.

919. Ringhead Bow Pencil, $5\frac{1}{2}$ in., with central thumbscrew, nickel silver legs and handle.

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ANVIL

TRADE MARK

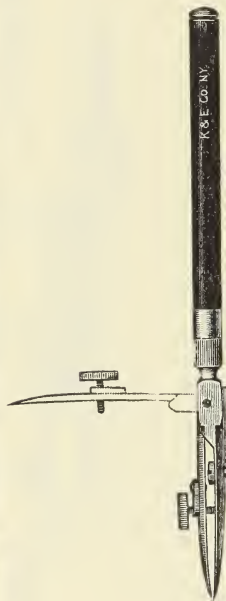
DRAWING INSTRUMENTS



No. 921.



No. 922. No. 924.



No. 922K.



No. 924K.

- 921. Pricker, 4 in. overall, with replaceable needle point 1 in. long, hollow metal handle with screw cap to hold extra needle points.
- 922. Ruling Pen, upper blade with spring, $4\frac{1}{2}$ in.
- 924. Ruling Pen, upper blade with spring, $5\frac{1}{2}$ in.
- 922K. Knife Spring Ruling Pen, $4\frac{1}{2}$ in.
- 924K. Knife Spring Ruling Pen, $5\frac{1}{2}$ in.

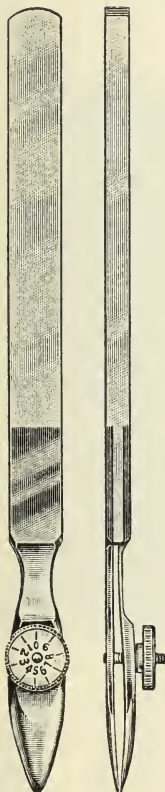
The Knife Spring ANVIL Pens, have a hinged upper blade actuated by a spring similar to that in a pocket knife, which either holds the pen open at 90 degree or presses it firmly against the fixed blade.

KEUFFEL & ESSER CO., NEW YORK

ANVIL

TRADE MARK

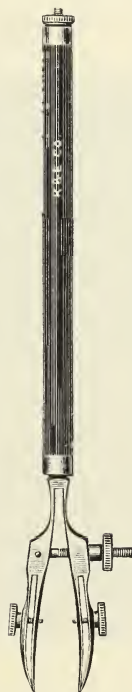
DRAWING INSTRUMENTS



No. 926.



No. 928.



No. 932.



No. 941.

926. Detail Ruling Pen, $5\frac{3}{4}$ in., upper blade with spring, flat aluminum handle, with graduated thumb screw.

928. Improved Curve Pen, $4\frac{3}{4}$ in., spring blades.

This pen has a hollow handle in which a thin rod rotates. The blades being fastened to the end of the rod and being eccentric to it, turn easily and follow the smallest curve with precision. By means of a nut at the upper end of the rod, the pen can be clamped and may then be used as a regular drawing pen.

932. Improved Railroad Pen, $5\frac{1}{4}$ in., spring blades.

The construction of this pen is like that of No. 928 with the exception that it has two pairs of blades.

941. Horncenter, $\frac{1}{2}$ in. diameter.

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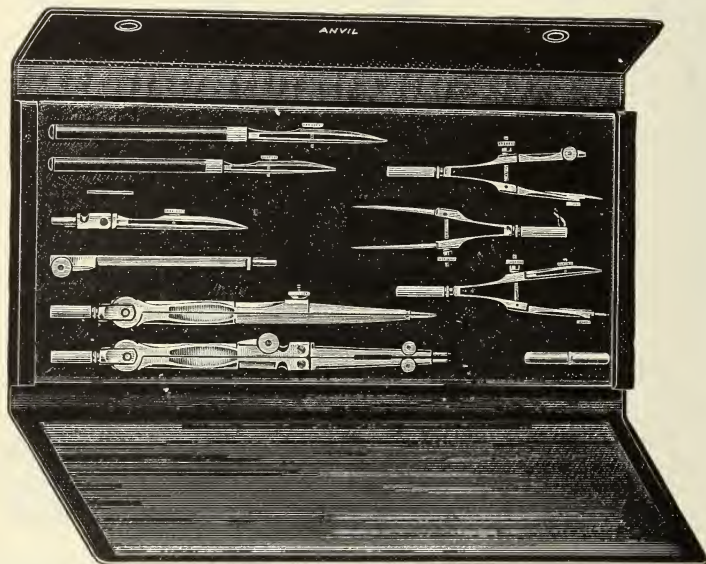
ANVIL

TRADE MARK

DRAWING INSTRUMENTS

(SQUARE TYPE)

ROLLED NICKEL SILVER



No. 946.

946. ANVIL Drawing Set, in lined case.

- 1 No. 900 Compasses, $6\frac{1}{4}$ in., with straightening device and fixed needle point, pen, pencil point and lengthening bar.
- 1 No. 903 Hairspring Dividers, 6 in., with straightening device.
- 1 No. 910 Steelspring Bow Dividers, $3\frac{1}{2}$ in.
- 1 No. 911 Steelspring Bow Pen, $3\frac{1}{2}$ in.
- 1 No. 912 Steelspring Bow Pencil, $3\frac{1}{2}$ in.
- 1 No. 922 Ruling Pen, $4\frac{1}{2}$ in., upper blade with spring.
- 1 No. 924 Ruling Pen, $5\frac{1}{2}$ in., upper blade with spring.
- 1 No. 941 Horn Center.
- 1 Aluminum Box with Leads and Needle Points.

946C. ANVIL Drawing Set, in lined case, containing same assortment as No. 946, but with Spring Bows Nos. 915, 916, and 917 (central thumbscrew) in place of Nos. 910, 911 and 912.

KEUFFEL & ESSER CO., NEW YORK

MARATHON

TRADE MARK

LONG LINE AND WIDE LINE

RULING PENS



No. 1092-9.

MARATHON Ruling Pens are a great convenience and time-saver. Holding several times more ink than ordinary ruling pens, they draw five to eight times more length of lines between fillings. They are made in five widths of nib to rule five different widths of line. Because the nibs are preset, these line widths can always be matched with certainty. The ink-flow is regular and even, and lines drawn are sharp and clean edged. MARATHON Pens are easy to handle for straight lines or guided curve lines and for freehand contour line work as well. Even when filled they can be laid down or placed in the grooves in the platform of the No. 1094 set without risk of the ink flowing out. Directions are included with individual pens and with the set.

LONG LINE

1092-9. MARATHON Long Line Ruling Pen, $5\frac{1}{2}$ in.,
for lines .009 in. width.

1092-13. MARATHON Long Line Ruling Pen, $5\frac{1}{2}$ in.,
for lines .013 in. width.

1092-20. MARATHON Long Line Ruling Pen, $5\frac{1}{2}$ in.,
for lines .020 in. width.

1094. MARATHON Long Line Ruling Pen Set, in
leatherite case containing 1 each Nos.
1092-9, 1092-13 and 1092-20.

WIDE LINE

1092-30. MARATHON Wide Line Ruling Pen, $5\frac{1}{2}$ in., for lines .030 in. width.

1092-60. MARATHON Wide Line Ruling Pen, $5\frac{1}{2}$ in., for lines .060 in. width.

KEUFFEL & ESSER CO., NEW YORK

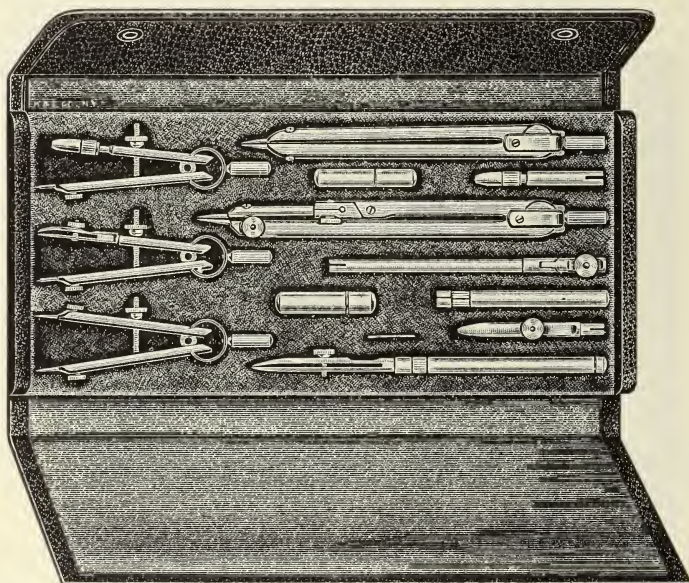
MERCURY

TRADE MARK ®

DRAWING INSTRUMENTS

(FLAT TYPE)

BRASS, CHROMIUM PLATED



No. 9125½.

9125½.

MERCURY Drawing Set, in lined case.

- 1 No. 9140 Plain Dividers, 5½ in., with straightening device.
- 1 No. 9142 Compasses, 6 in., with straightening device, needle point, pen, pencil point and lengthening bar.
- 1 No. N9145 Ringhead Bow Dividers, 3½ in.
- 1 No. N9146 Ringhead Bow Pen, 3½ in., with needle point.
- 1 No. N9147 Ringhead Bow Pencil, 3½ in., with needle point.
- 1 No. 9149 Ruling Pen, 5½ in., upper blade with spring.
- 1 Extra Handle, 2½ in., for compass pen.
- 1 Box with Leads.
- 1 Box with Repair Parts.

9123½.

MERCURY Drawing Set, in lined case, containing same assortment as No. 9125½, but without Nos. 9140 and N9145.

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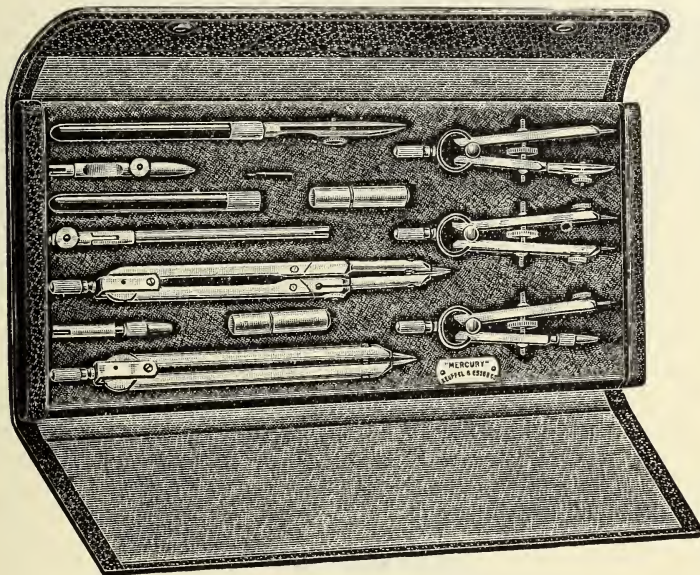
MERCURY

TRADE MARK ®

DRAWING INSTRUMENTS

(FLAT TYPE)

BRASS. CHROMIUM PLATED



No. 9125 $\frac{1}{2}$ C.

9125 $\frac{1}{2}$ C.

Mercury Drawing Set, in lined case.

- | | |
|--------------------------|--|
| 1 No. 9140 | Plain Dividers, 5 $\frac{1}{2}$ in., with straightening device. |
| 1 No. 9142 $\frac{1}{2}$ | Compasses, 6 in., with straightening device, knee joint in both legs; needle point, pen, pencil point and lengthening bar. |
| 1 No. N9145C | Ringhead Bow Dividers, with central thumbscrew, 3 $\frac{1}{2}$ in. |
| 1 No. N9146C | Ringhead Bow Pen, with central thumbscrew, and with needle point, 3 $\frac{1}{2}$ in. |
| 1 No. N9147C | Ringhead Bow Pencil, with central thumbscrew, and with needle point, 3 $\frac{1}{2}$ in. |
| 1 No. 9149 | Ruling Pen, 5 $\frac{1}{4}$ in., upper blade with spring. |
| 1 | Extra Handle, 2 $\frac{1}{2}$ in., for compass pen. |
| 1 | Box with Leads. |
| 1 | Box with Repair Parts. |

KEUFFEL & ESSER CO., NEW YORK

MERCURY

TRADE MARK®

REPAIR PARTS NO. 9139

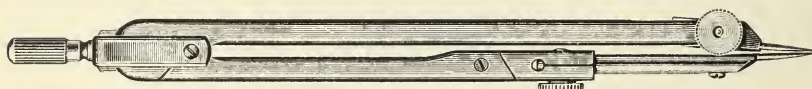
- 9139—1 Bow Spring Head and Handle.
- 2 Bow Adjusting Screw with Nuts. complete.
- 2a Bow Adjusting Screw only.
- 2b Adjusting Nuts for Bows.
- 2c Washer for Bow Adjusting Screw and Nut.
- 3 Large Ruling Pen Adjusting Screw.
- 5a T-Bolts for Bow Pen.
- 5b Clamp Nuts for Bows and Pen Points.
- 6 Nut for Compass.
- 7 T-Bolts for Lengthening Bar, Pen Insert, Compasses.
- 10 Bow Needle Clamp Screw (nut is No. 9139-5b).
- 11 Compass Head Screw Bolts.
- 12a Shouldered Compass Needle.
- 12b Divider Needle.
- 12c Bow Divider Needle.
- 12d Shouldered Bow Needle.
- 13a Compass Needle Screw, complete.
- 13b Divider Needle Screw.
- 15 Compass Needle Holder.
- 16 Plastic Washer for Ruling Pen.
- 16a Plastic Washer for Compass and Bow Pen Parts.
- 17 Ferrule for Pencil Lead.
- 18 Head Pivot for "N" Bows.

MERCURY

DRAWING INSTRUMENTS



No. 9140.



No. 9142.

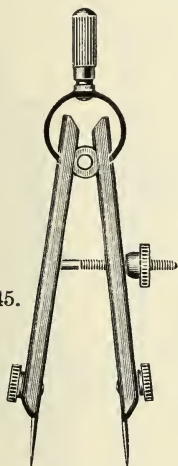
- 9140. Plain Dividers, $5\frac{1}{2}$ in., with straightening device.
- 9142. Compasses, 6 in., with straightening device, needle point, pen, pencil point, lengthening bar, and pen handle.

KEUFFEL & ESSER CO., NEW YORK

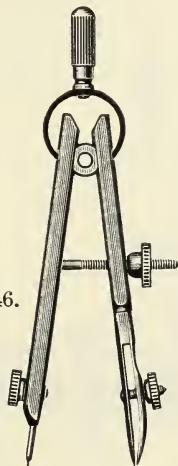
MERCURY

TRADE MARK®

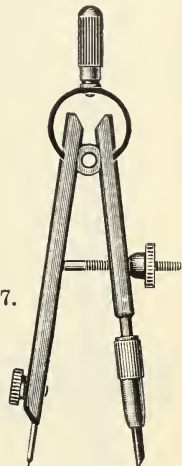
BOW INSTRUMENTS



No. N9145.



No. N9146.

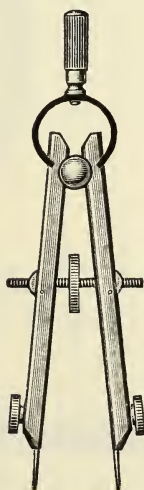


No. N9147.

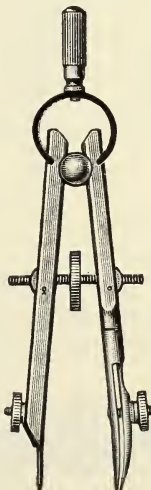
N9145. Ringhead Bow Dividers, $3\frac{1}{2}$ in.

N9146. Ringhead Bow Pen, $3\frac{1}{2}$ in., with needle point.

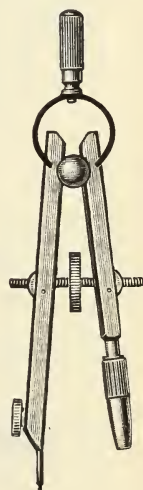
N9147. Ringhead Bow Pencil, $3\frac{1}{2}$ in., with needle point.



No. N9145C.



No. N9146C.



No. N9147C.

N9145C. Ringhead Bow Dividers, with central thumbscrew, $3\frac{1}{2}$ in.

N9146C. Ringhead Bow Pen, with central thumbscrew and with needle point, $3\frac{1}{2}$ in.

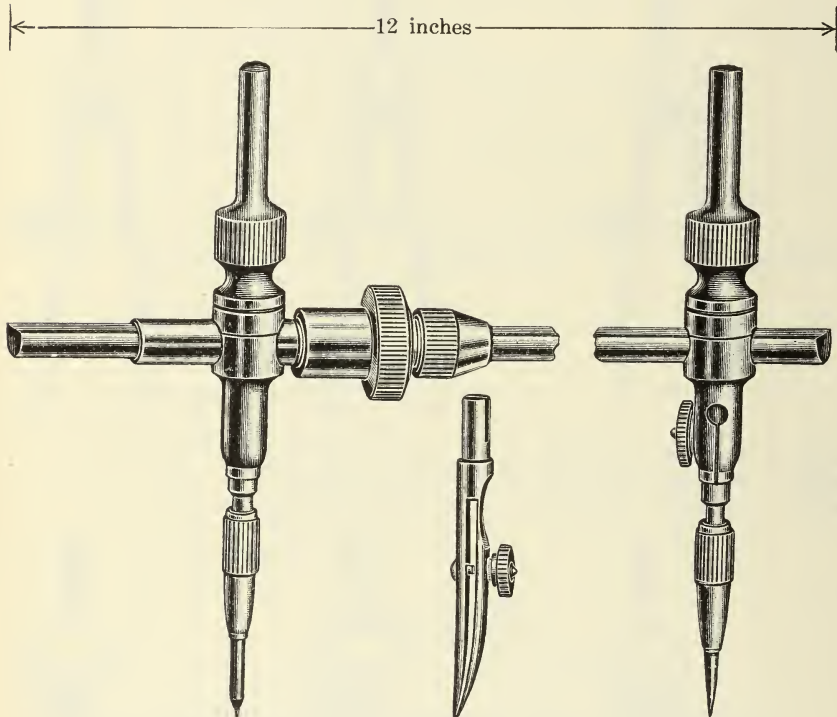
N9147C. Ringhead Bow Pencil, with central thumbscrew and with needle point, $3\frac{1}{2}$ in.

KEUFFEL & ESSER CO., NEW YORK

MERCURY

TRADE MARK ®

DRAWING INSTRUMENTS



No. N9155.

N9155. Beam Compasses.

All metal, chrome plated. Includes 12 in. stainless steel bar, pen, pencil and needle point, micrometer adjustment; box with pencil leads. In cardboard box.



No. N9155A.

N9155A. Coupler for No. N9155.

N9155B. 12 in. Bar for No. N9155.

With each coupler and extra bar, the length of the beam of No. N9155 is increased by 12 inches.

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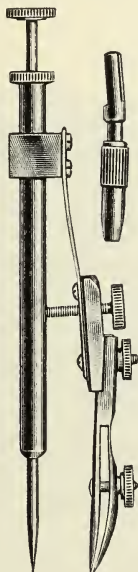
MERCURY

TRADE MARK (R)

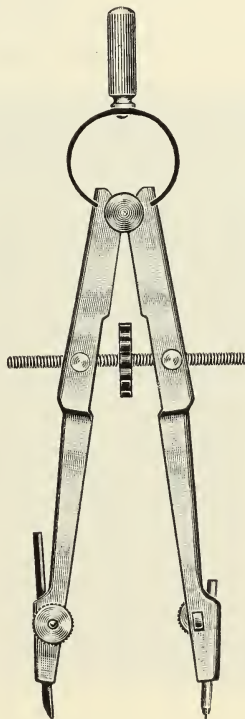
DRAWING INSTRUMENTS



No. 9149.



No. 9164.



No. 9169.



No. 9176.

9149. Ruling Pen, $5\frac{1}{4}$ in., upper blade with spring.

9164. Drop Bow Pen and Pencil, pen with spring blade, 4 in.

Circles which can be made with this instrument range from $\frac{1}{8}$ in. to 1 in. in diameter.

9169. Ringhead Bow Pencil, $5\frac{1}{2}$ in., with central thumbscrew.

Circles which can be made with this instrument range from $\frac{1}{8}$ in. to $9\frac{1}{2}$ in. in diameter.

9176. Improved Curve Pen, $4\frac{3}{4}$ in., spring blade.

This pen has a hollow handle in which a thin rod rotates. The blades being fastened to the end of the rod and being eccentric to it, turn easily and follow the smallest curve with precision. By means of a nut at the upper end of the rod, the pen can be clamped and may then be used as a regular ruling pen.

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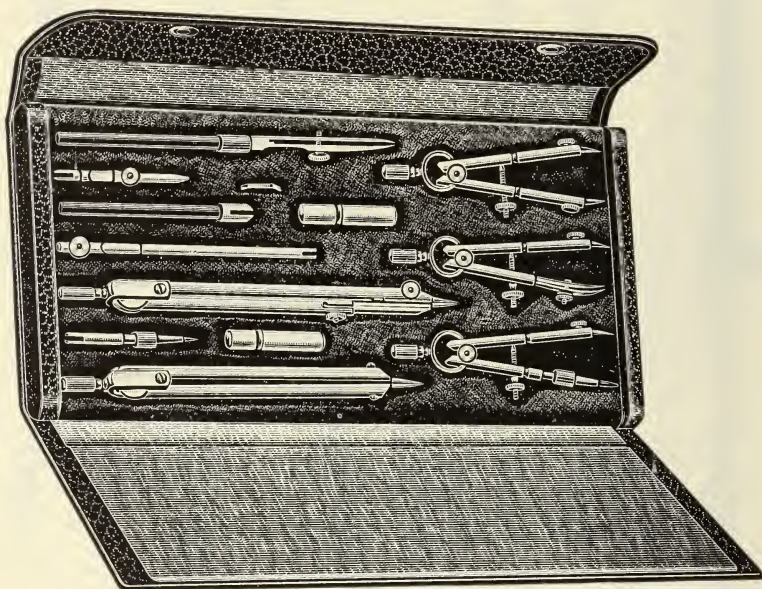
NEPTUNE

TRADE MARK

DRAWING INSTRUMENTS

(FLAT TYPE)

BRASS, NICKEL PLATED



No. 9225 $\frac{1}{2}$.

9225 $\frac{1}{2}$. NEPTUNE Drawing Set, in lined case.

- 1 No. 9240 Plain Divider, 5 $\frac{1}{2}$ in. with straightening device.
- 1 No. 9242 Compasses, 6 in., with straightening device, needle point, pen, pencil point and lengthening bar.
- 1 No. 9245 Ringhead Bow Dividers, 3 $\frac{1}{2}$ in.
- 1 No. 9246 Ringhead Bow Pen, 3 $\frac{1}{2}$ in., with needle point.
- 1 No. 9247 Ringhead Bow Pencil, 3 $\frac{1}{2}$ in., with needle point.
- 1 No. 9249 Ruling Pen, 5 $\frac{1}{4}$ in., upper blade with spring.
- 1 Extra Handle, 2 $\frac{1}{2}$ in., for compass pen.
- 1 Box with Leads.
- 1 Box with Repair Parts.

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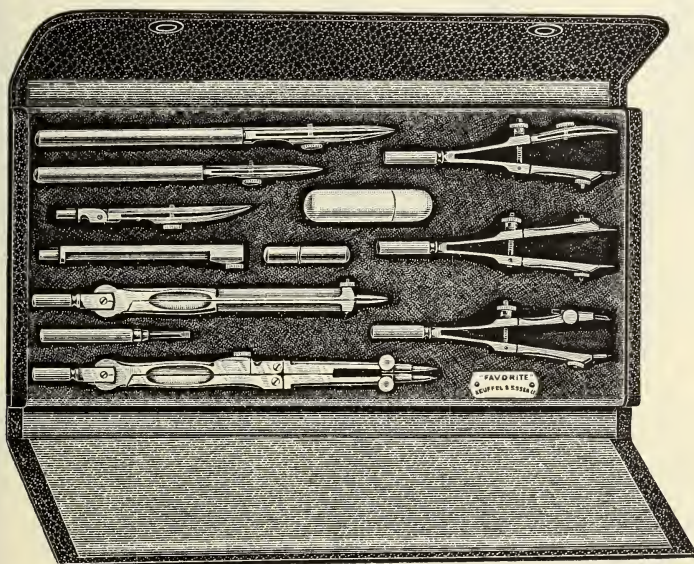
FAVORITE

TRADE MARK

DRAWING INSTRUMENTS

(SQUARE TYPE)

NICKEL SILVER



No. N9526.

N9526. FAVORITE Drawing Set, in lined case.

- 1 No. 9542 Compasses, 6 in., with straightening device, fixed needle point, pen, pencil point and lengthening bar.
- 1 No. 9541 Hairspring Dividers, $5\frac{1}{2}$ in., with straightening device.
- 1 No. 9545 Steelspring Bow Dividers, $3\frac{1}{4}$ in.
- 1 No. 9546 Steelspring Bow Pen, $3\frac{1}{4}$ in., with needle point.
- 1 No. 9547 Steelspring Bow Pencil, $3\frac{1}{4}$ in., with needle point.
- 1 No. 9548 Ruling Pen, $4\frac{1}{4}$ in., upper blade with spring.
- 1 No. 9549 Ruling Pen, $5\frac{1}{4}$ in., upper blade with spring.
- 1 Box with Leads.
- 1 Box with Repair Parts.
- 1 Adjustable Screwdriver.

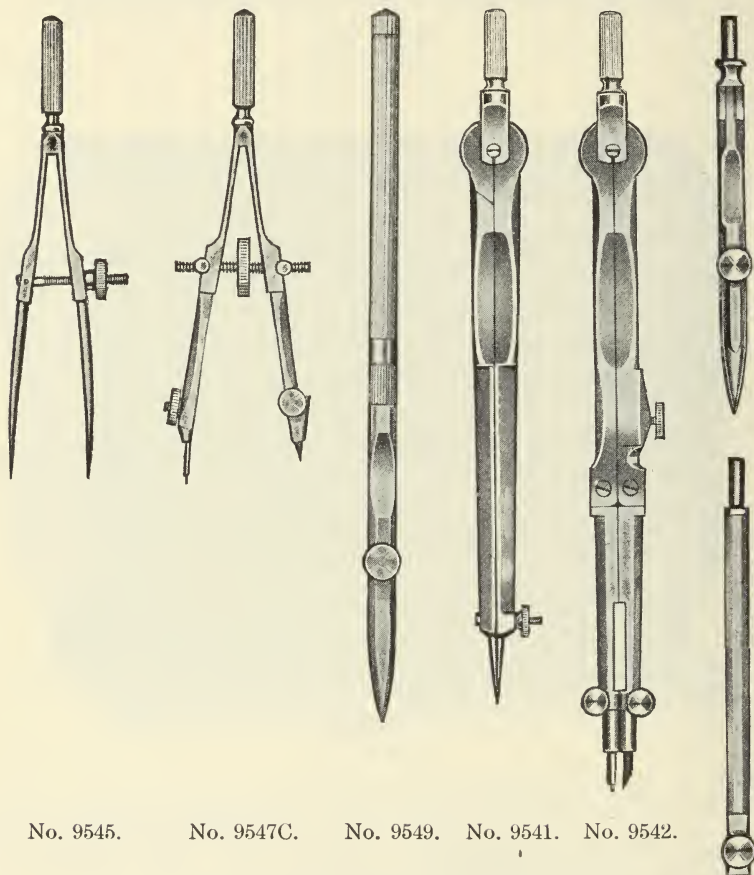
N9526C. FAVORITE Drawing Set, in lined case, same assortment as N9526 but with Spring Bows Nos. 9545C, 9546C, and 9547C (central thumbscrew) in place of Nos. 9545, 9546, and 9547.

KEUFFEL & ESSER CO., NEW YORK

FAVORITE

TRADE MARK

DRAWING INSTRUMENTS



- No. 9545. No. 9547C. No. 9549. No. 9541. No. 9542.
9541. Hairspring Dividers, with straightening device, $5\frac{1}{2}$ in.
 9542. Compasses, 6 in., with straightening device, and fixed needle point, pen, pencil point and lengthening bar.
 9545. Steelspring Bow Dividers. $3\frac{1}{4}$ in., nickel silver handle.
 9545C. Steelspring Bow Dividers, $3\frac{1}{4}$ in., with central thumbscrew, nickel silver handle.
 9546. Steelspring Bow Pen, $3\frac{1}{4}$ in., nickel silver handle.
 9546C. Steelspring Bow Pen, $3\frac{1}{4}$ in., with central thumbscrew, nickel silver handle.
 9547. Steelspring Bow Pencil, $3\frac{1}{4}$ in., nickel silver handle.
 9547C. Steelspring Bow Pencil, $3\frac{1}{4}$ in., with central thumbscrew, nickel silver handle.
 9549. Ruling Pen, $5\frac{1}{4}$ in., upper blade with spring, aluminum handle.

SUSPENDED PANTOGRAPHS

The pantograph is a device for enlarging or reducing a drawing, map or picture to scale. It is essentially a hinged parallelogram with a pole, a tracer point and a pencil point, set in line of the parallelogram's diagonal. If the pole is at one corner and the tracer at the opposite diagonal, then the pencil point will produce a reduction to scale. If the tracer point and pencil point are reversed, the instrument will produce an enlargement.

To adjust the position of the bar which carries the intermediate point, in order to set the instrument at the desired ratio of reduction or enlargement, the simpler pantographs such as N1134 are equipped with holes at selected positions, while the more elaborate instruments have precisely fitted slides with verniers to be read against graduations on the arms. Nos. N1123 and N1124C have a special provision for pivoting the device at the intermediate point. This arrangement is desirable when only a slight enlargement or reduction is desired.

All these instruments have many new features not found on previous designs, including greater ease of assembly and disassembly, smaller cases, ball bearing joints, smoother action, and improved pencil lifting and leveling arrangements.

N1123. Precision Suspended Pantograph, 39½ inch bars, for enlarging or reducing maps, etc. to any scale between full size and 1:20.

Bars are rectangular nickel-plated metal tubing, graduated with uniform scales, also with fixed ratio lines. Sliding joints are equipped with verniers and slow motion screws for precise settings. Semi-automatic cord device for lifting pencil from tracer position. Heavy iron standard with extra weight and leveling device. Adjustable suspension wires. Complete with all necessary accessories and instructions, in hardwood case.

N1124C. Precision Suspended Pantograph, like N1123 but with clamping standard instead of weighted standard.

N1131. Suspended Pantograph, 39½ inch bars, for enlarging or reducing maps etc. to any scale ranging between 4:5 and 1:20.

Bars are rectangular nickel-plated metal tubing, graduated with uniform scales. Sliding joints are equipped with verniers. Cord device for lifting pencil from tracer position. Heavy iron standard with extra weight and leveling device. Complete with all necessary accessories and instructions, in hardwood case.

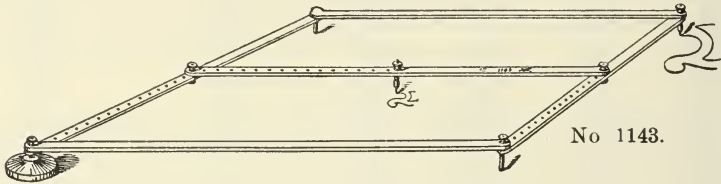
N1134. Suspended Pantograph, 39½ inch bars, for enlarging and reducing maps, etc. in the following ratios; 4:5, 3:4, 2:3, 3:5, 1:2, 2:5, 1:3, 1:4, 1:5, 1:6, 1:8, 1:10.

Bars are rectangular metal tubing provided with holes accurately spaced for the above ratios. Heavy iron standard. Complete with all necessary accessories and instructions, in wooden box.

KEUFFEL & ESSER CO., NEW YORK

HARDWOOD PANTOGRAPH

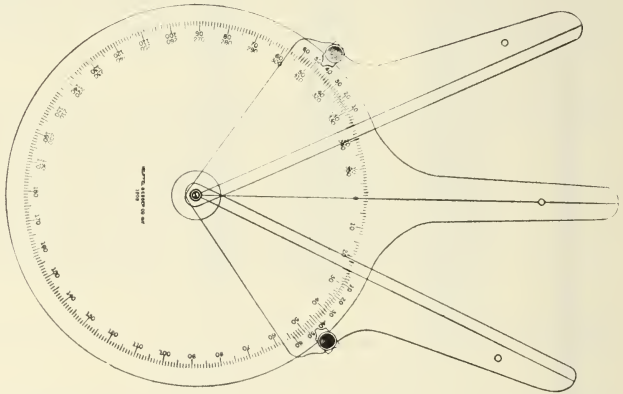
Pantograph No. 1143 has improved tracer and lead holders fitted for the usual Artist Lead, which is interchangeable with the steel tracer point, without inter-changing the holders themselves. These points are held by a screw sleeve. All metal parts are nickel plated.



- 1143.** Pantograph of polished Hardwood, bars $22\frac{1}{2}$ in.; for reducing and enlarging drawings in 15 ratios, from 2:1 to 16:1 or vice-versa; with Directions.

XYLONITE 3-ARM PROTRACTOR

No. 1205.



As made for the U. S. Navy and the U. S. Coast and Geodetic Survey, this protractor is especially designed for graphic solution of the three-point problem. It is particularly useful for quick, accurate plotting of a ship's position from sextant angles on shore objects. It is invaluable for hydrographic surveys where accurate positions are often required at intervals not exceeding two minutes.

Made of light flexible transparent xylonite (with brass fittings), the protractor has an eleven inch full circle graduated to single degrees and numbered every ten degrees 360° in the clockwise direction, and also 180° counter-clockwise from the zero point of the fixed arm. All markings are permanently black-filled, finely cut but clear and distinct.

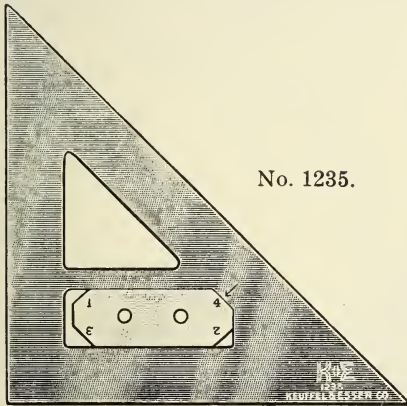
The two movable arms each extend 13 inches from the center. Each carries a 29-to-30 single direct vernier reading to two minutes of arc. Full advantage is afforded by the transparency of the members to make a quick, easy, accurate reading or setting. The vernier scale overlaps the protractor scale. Parallax is eliminated by graduating the scales on touching faces. Each movable arm carries a quick acting clamp.

All three arms have full length direction lines radiating from the center, cut on the lower face to avoid parallax. There are pin holes directly on these lines near the edge of the protractor and also near the ends of the arms. A pin hole in the brass hub marks the exact center point. The center is protected by a xylonite disc.

- 1205.** Xylonite Three-Arm Protractor, in folding cardboard case.



SECTION LINER TRIANGLE

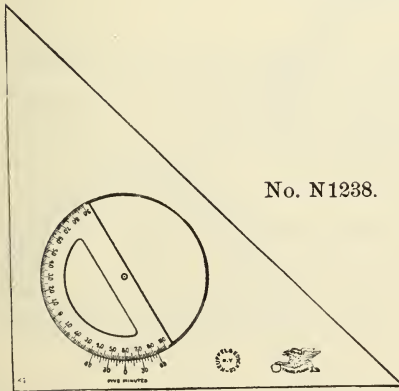


No. 1235.

With this 7 inch transparent triangle, section lines can be quickly drawn diagonally or vertically at four different spacing intervals over any desired area. The triangle is placed against a T-square or straightedge with the white sliding shuttle parallel to it, and triangle and shuttle are moved alternately. The spacing interval is determined by the numbered corner of the shuttle which is set to the arrow on the triangle. Section lines in pairs and a variety of other patterns can also be drawn with this triangle. Reversible.

1235. Section Liner Triangle, 7 in., xylonite, (transparent), 45°.

ADJUSTABLE PROTRACTOR TRIANGLE



No. N1238.

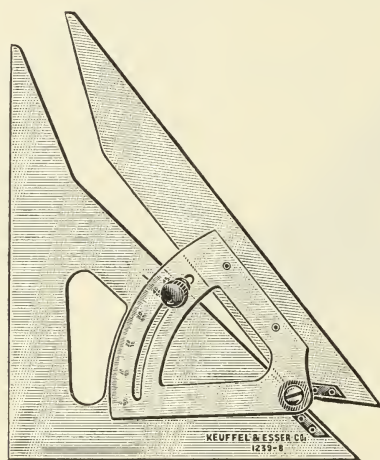
The semicircular protractor, $3\frac{1}{2}$ in. diam., is graduated to single degrees, numbered 0-90 at every 10 degrees in both directions, double vernier reading to 5 minutes. It revolves in a circular groove, where it is held by a spring. The triangle and protractor are flush on both sides so that either side can be used for drawing slopes in opposite directions, etc. The base line of the protractor has a drawing edge.

N1238. Adjustable Protractor Triangle, 8 in., xylonite, (transparent), 45°.

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XYLONITE TRI-TRACTOR

TRADE MARK



No. 1239-8.

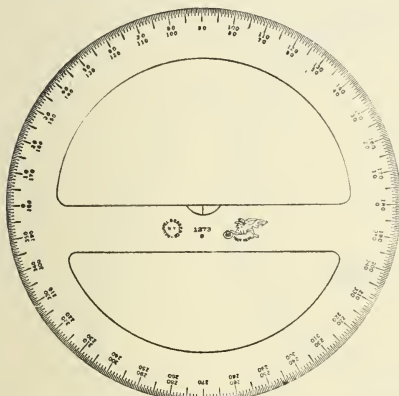
1239-8. Xylonite TRI-TRACTOR—8 in.

This instrument combines the functions of the protractor and the triangle. It is a right angle triangle, the hypotenuse of which can be set at any desired angle with one of the bases. The protractor element is equivalent in size to a 7 in. protractor and is graduated to half degrees. The upper row of numbers indicates angles from 0° to 45° with the 8 in. base; the lower row indicates angles from 45° to 90° with the shorter base. The index line and the protractor graduations are on adjacent surfaces to avoid parallax. Angles may be set to half-degrees, and by estimation to about 10 minutes of arc. The hinge is of non-tarnishing metal, is free from play, and is adjustable. Moveable arm 9½ in.

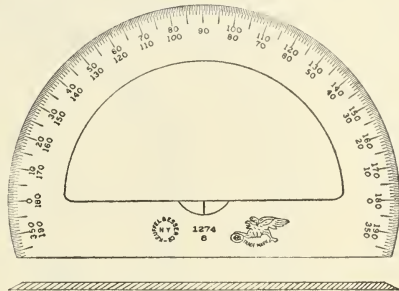
1239-10. Xylonite TRI-TRACTOR—10 in., like No. 1239-8 but with 10 in. base.

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K & E TRANSPARENT PROTRACTORS



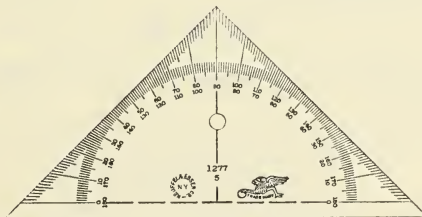
No. 1273.



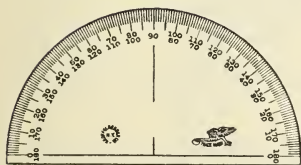
No. 1274.

BEVELED EDGE.

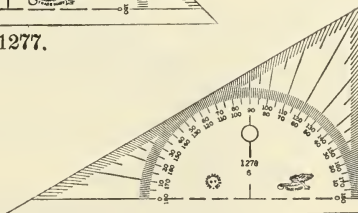
- 1273-6. Circular Luxlite Protractor, beveled edge, 6 in., $\frac{1}{8}$ °
 -8. " " " " " 8 " $\frac{1}{8}$ °
 -10. " Xylonite " " " 10 " $\frac{1}{8}$ °
 1274-6. Semicircular Luxlite Protractor, beveled edge, 6 in., $\frac{1}{8}$ °
 -8. " " " " " 8 " $\frac{1}{8}$ °



No. 1277.



No. 1276.

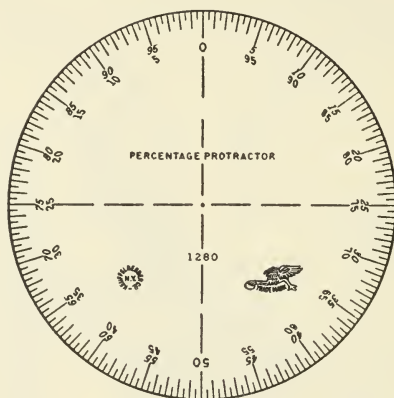


No. 1278.

- 1276-4. Semicircular Luxlite Protractor, 4 in., div. to 1°
 -10. " Xylonite " 10 " " $\frac{1}{2}$ °
 1277-5. Xylonite Protractor Triangle, 45°, 5 " " 1°
 -7. " " " " 7 " " 1°
 1278-6. Xylonite Protractor Triangle, 30 × 60°, 6 in., div. to 1°

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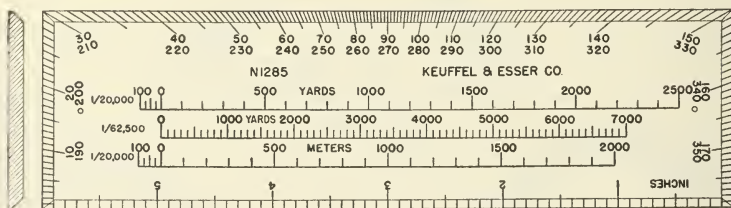
K & E PERCENTAGE PROTRACTOR



1280. **Circular Xylonite (transparent) Percentage Protractor, 4 in.,** divided to $\frac{1}{2}$ per cent, numbered with two rows of figures in opposite directions, from 0 to 100 per cent.

The K & E Percentage Protractor is of particular value to Statisticians, since it can be employed in the construction and measurement of "pie" charts and similar graphs dealing with business statistics.

K & E MILITARY PROTRACTOR-SCALE



N1285. Military Protractor-Scale.

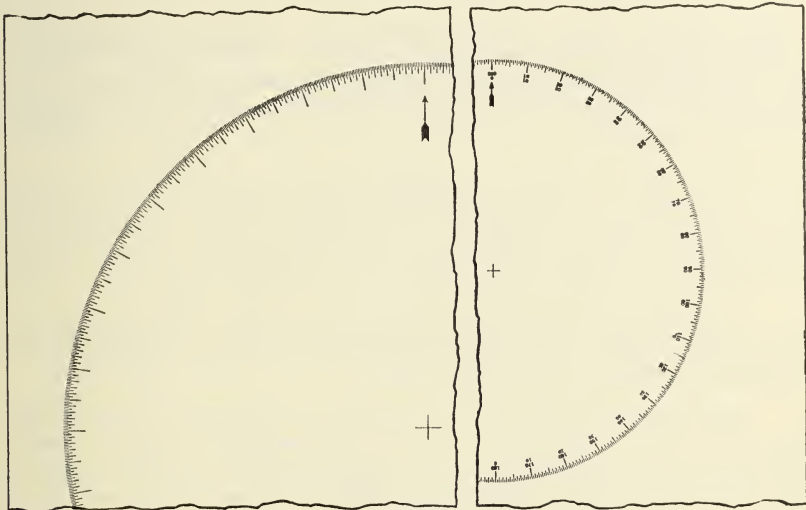
This protractor-scale is made in accordance with specifications of U. S. Army Corps of Engineers. Includes in convenient form the scales most needed for the rapid field solution of map problems.

It is made of transparent xylonite, is 6 in. by $1\frac{3}{4}$ in. and $\frac{1}{8}$ in. thick with beveled edges. All marking are on the under side to avoid parallax.

1. A protractor graduated to single degrees and numbered clockwise from 0° to 180° and from 180° to 360° .
2. A 6 in. scale divided to tenths of inches.
3. A scale of 1:20,000 graduated in yards.
4. A scale of 1:20,000 graduated in meters.
5. A scale of 1:62,500 graduated in yards.



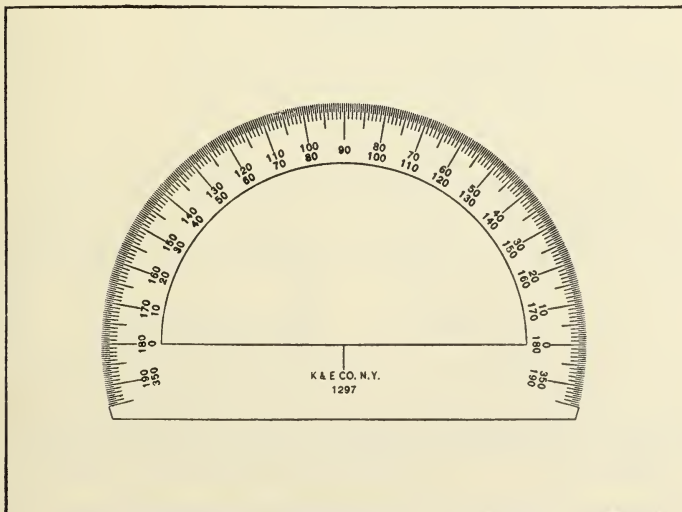
PAPER PROTRACTORS



No. 1295

1296 $\frac{1}{2}$

1295. Bristol Board, Circular, 14 in. diam. div. $\frac{1}{4}^{\circ}$, Sheet $16\frac{1}{2} \times 22$ in.
 1295 $\frac{1}{2}$. Bristol Board, Circular, 14 " " " $\frac{1}{4}^{\circ}$ " $16\frac{1}{2} \times 22$ "
 outer row numbered 0 to 360, inner row in quadrants.
 1296. Bristol Board, Circular, 8 in. diam. div. $\frac{1}{2}^{\circ}$, Sheet 12×14 in.
 1296 $\frac{1}{2}$. Bristol Board, Circular, 8 " " " $\frac{1}{2}^{\circ}$ " 12×14 "
 outer row numbered 0 to 360, inner row in quadrants.



1297. Bristol Board, Semicircular, 5 in. diam. div. $\frac{1}{2}^{\circ}$, Sheets $5\frac{1}{2} \times 7$ in., two
 rows of numbers 0 to 180 in opposite directions.

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K & E

ISOMETRIC DRAWING EQUIPMENT

Pictorial forms of drawing are being used increasingly in industry. They aid workers to a quicker understanding of dimensions, construction details and assembly relationships.

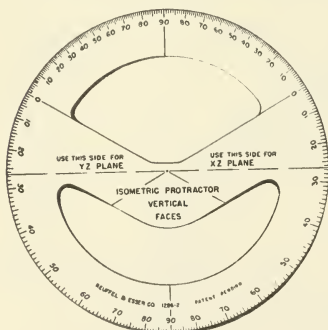
Of all forms of production drawing, the Isometric Method is the most practical, because an isometric drawing, besides presenting the object as it looks, is much easier to make than a perspective drawing. Furthermore, all measurements in the three major axes are true to scale in an isometric drawing and identical with those of the corresponding orthographic drawing.

The K&E Isometric Drawing Instruments listed on this and the two following pages have been specially designed to speed up and simplify the making of isometric production drawings.

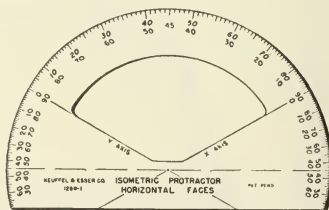
Supplementing these instruments, the K & E Isometric Cross Section Papers Nos. 358-28L, 359-28LB and 359-28LG (see page 63) afford considerable help in isometric drawing. They are the only cross section papers on which both isometric and orthographic measurements can be made with equal ease.

ISOMETRIC PROTRACTORS

Oblique lines in orthographic planes take new directions and lengths in isometric drawings. Nos. 1286-1 and 1286-2 Isometric Protractors show the correct isometric directions for such lines.



No. 1286-2



No. 1286-1

1286-1. Isometric Protractor for Horizontal Faces, transparent plastic, semi-circular, 5 in.

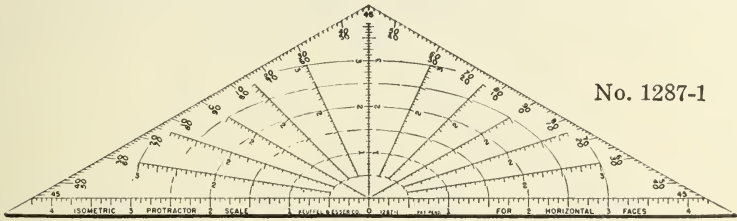
1286-2. Isometric Protractor for Vertical Faces, transparent plastic, circular, 5 in.



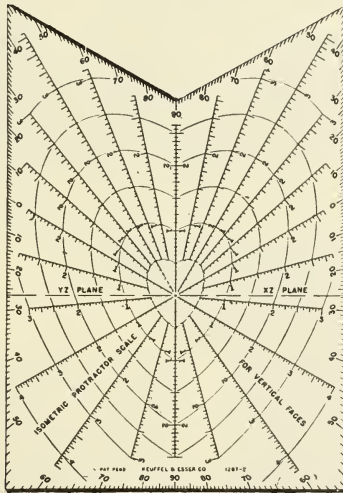
ISOMETRIC DRAWING EQUIPMENT (CONTINUED)

ISOMETRIC PROTRACTOR SCALES

Nos. 1287-1 and 1287-2 Isometric Protractor Scales give both correct directions and scale lengths as well. They also take the place of the usual triangles.



No. 1287-1



No. 1287-2

1287-1. Isometric Protractor Scale for Horizontal Faces, transparent plastic.

1287-2. Isometric Protractor Scale for Vertical Faces, transparent plastic.

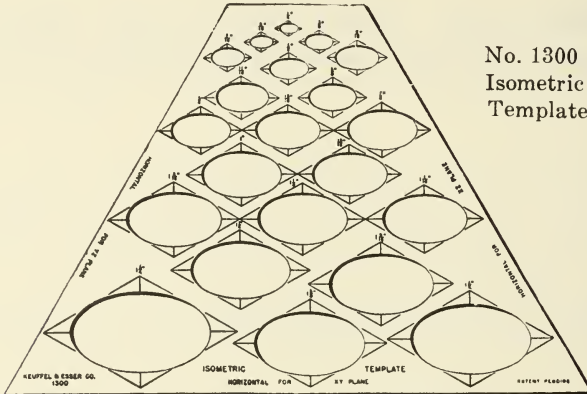
ISOMETRIC TEMPLATE

Circles in orthographic drawings become ellipses in isometric. With the Isometric Template any small ellipse can be quickly and accurately drawn with one pencil stroke. The template has special provisions by which it is correctly oriented and centered in any of the three co-ordinate planes. The Isometric Template has a variety of other useful features; for example, as a supplement to the French Curve for arcs of high curvature.

1300. Isometric Template, for making ellipses to represent circles, transparent plastic.

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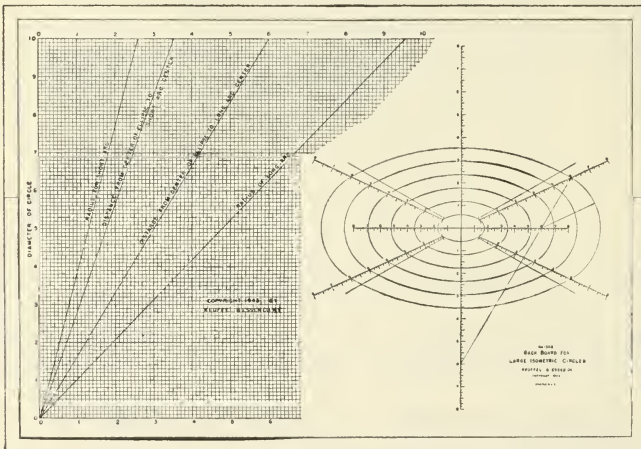
ISOMETRIC DRAWING EQUIPMENT (CONTINUED)



No. 1300
Isometric
Template

ISOMETRIC BACK BOARD

With the aid of this Back Board approximate ellipses are quickly constructed to represent circles in any of the coordinate planes in the isometric view. On the reverse side is the Isometric Cross Section Grid in black (No. 358-28L, see page 63.) When making drawings on Tracing Paper or Cloth, either side can be used underneath the drawing as a guide.



No. 1308

- 1308. Isometric Back Board and Cross Section Grid, 12 × 18 in., Bristol Board.
- 1310-1. Isometric Drawing Kit complete; consists of one each of the following Isometric Drawing Instruments: Nos. 1286-1, 1286-2, 1287-1, 1287-2, 1300; Back Board, 1308; ALBANENE Sketch Pad 195L-12 (50 sheets, 11 × 17 in.); Instructions Book 1312.
- 1312. Instructions for the use of the Isometric Drawing Kit, No. 1310-1, 24 pages, 8½ × 11 in.

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ISOMETRIC TEMPLATES

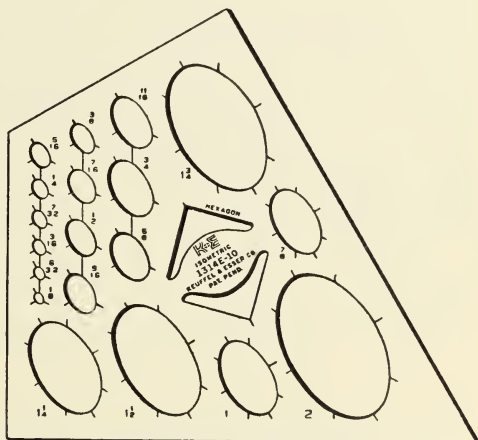
(CONTINUED)

The two templates listed below form a set by means of which ellipses may be quickly drawn in isometric to represent circles ranging from $\frac{1}{8}$ in. to 5 in. diameter. Radial marks indicate the isometric axes.

With the aid of the No. 1317P-10 Speedraft Pencil the number of circles within this range can be increased to a full series at $\frac{1}{16}$ in. increments.

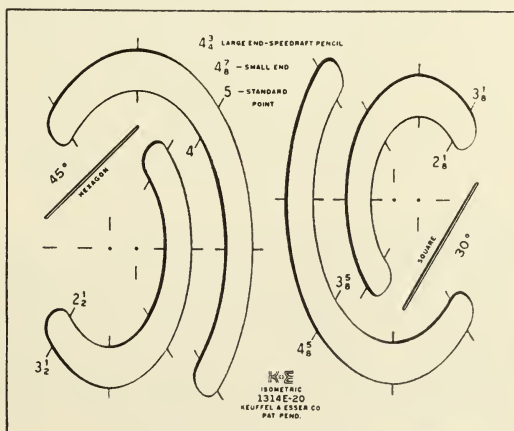
1314E-10 Isometric Template, transparent plastic, for drawing isometric representations of circles from $\frac{1}{8}$ in. to 2 in. diameter, also for isometric projection of hexagons.

Edges of this template are at angles which permit the ellipses to be correctly oriented in either of two positions of the isometric axes.



1314E-20 Isometric Template, transparent plastic, for drawing isometric representations of circles from $2\frac{1}{8}$ in. to 5 in. diameter, also for isometric projection of hexagons.

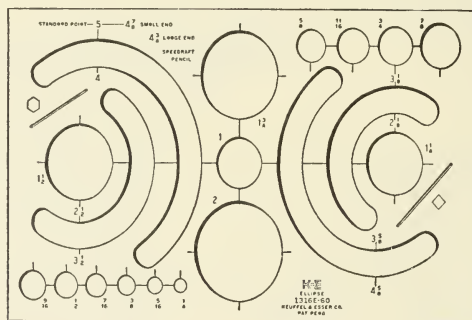
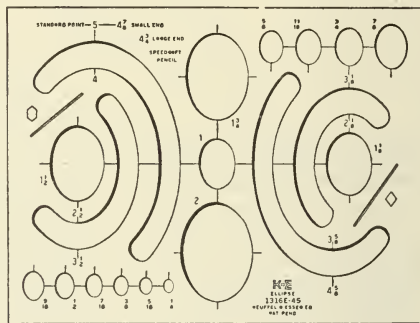
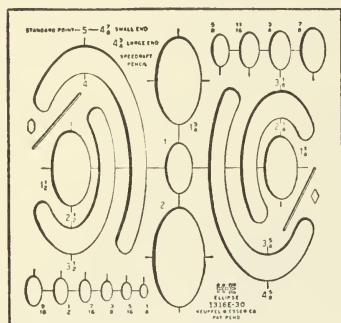
The usefulness of this template is greatly increased with the aid of the No. 1317P-10 Speedraft Pencil. Ellipses on this template can be drawn complete in two strokes by a half turn of the template.



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ELLIPSE TEMPLATES

The three templates listed below form a set by means of which ellipses may be quickly drawn in various sizes from $\frac{1}{4}$ in. to 5 in. major axis, and in three different degrees of ellipticity. With the aid of the No. 1317P-10 Speedraft Pencil this range can be increased on each template to a full series at $\frac{1}{16}$ in. increments. Ellipses over 2 in. can be drawn complete in two strokes by a half turn of the template. Radial lines locate the axes of the ellipses.



- 1316E-30 Ellipse Template**, transparent plastic, for drawing ellipses with major axes of $\frac{1}{4}$ in. to 5 in., with ratio of minor to major axes of 0.5 to 1.
- 1316E-45 Ellipse Template**, transparent plastic, for drawing ellipses with major axes of $\frac{1}{4}$ in. to 5 in., with ratio of minor to major axes of 0.707 to 1.
- 1316E-60 Ellipse Template**, transparent plastic, for drawing ellipses with major axes of $\frac{1}{4}$ in. to 5 in., with ratio of minor to major axes of 0.866 to 1.

1317P-10 Speedraft Pencil (See page 140.)

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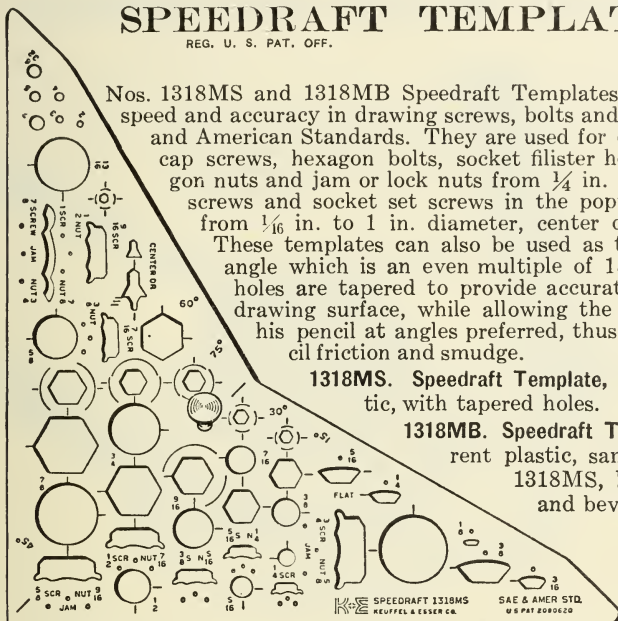
SPEEDRAFT TEMPLATES

REG. U. S. PAT. OFF.

Nos. 1318MS and 1318MB Speedraft Templates give great ease, speed and accuracy in drawing screws, bolts and nuts to the SAE and American Standards. They are used for drawing hexagon cap screws, hexagon bolts, socket filister head screws, hexagon nuts and jam or lock nuts from $\frac{1}{4}$ in. to 1 in., flat head screws and socket set screws in the popular sizes, circles from $\frac{1}{16}$ in. to 1 in. diameter, center drills in six sizes. These templates can also be used as triangles for any angle which is an even multiple of 15° . The template holes are tapered to provide accurate contact at the drawing surface, while allowing the draftsman to tilt his pencil at angles preferred, thus eliminating pencil friction and smudge.

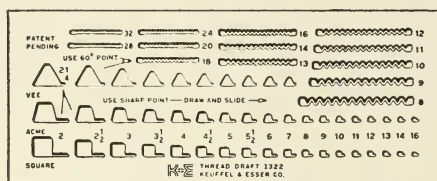
1318MS. Speedraft Template, transparent plastic, with tapered holes.

1318MB. Speedraft Template, transparent plastic, same design as No. 1318MS, but with tapered and beveled holes.



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THREAD DRAFT TEMPLATE



The No. 1322 Thread Draft Template speeds up the accurate profile outlines of screw threads in the following forms of thread and ranges of sizes:

U. S. Standard or American National $2\frac{1}{4}$ to 32 threads per inch

Acme 2 to 16 “ “ “

Square 2 to 16 “ “ “

1322. Thread Draft Template, transparent plastic.

SPEEDRAFT PENCIL

REG. U. S. PAT. OFF.



No. 1



No. 2



No. 3



No. 4

Adapters. Actual Size.

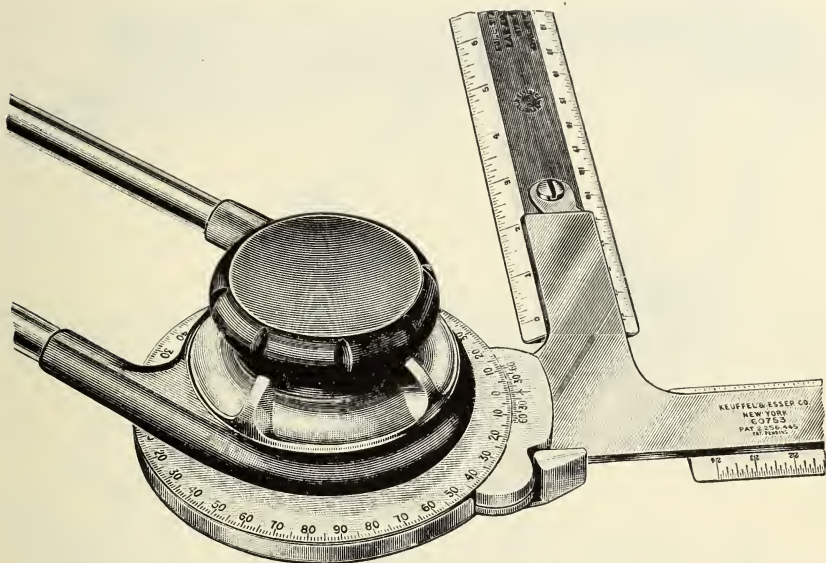
The No. 1317P-10 Speedraft Pencil, in addition to being a very efficient clutch type draftsman's pencil for all drafting work, is specially designed for use in conjunction with the Nos. 1314E-10 and 1314E-20 Isometric Templates and Nos. 1316E-30, 1316E-45 and 1316E-60 Ellipse Templates in the manner described under those items. This pencil holds standard drafting leads. The metal tip with which it is fitted for standard drafting is removable. This can be replaced by any one of four adapters furnished with the pencil for use when the axis of ellipses on the templates are to be increased or decreased as follows: No. 1 $\frac{1}{16}$ in., No. 2 $\frac{1}{8}$ in., No. 3 $\frac{3}{16}$ in., No. 4 $\frac{1}{4}$ in.

1317P-10. Speedraft Pencil, with four adapters and eraser tip.



PARAGON DRAFTING MACHINE

REG. U. S. PAT. OFF.



The new Paragon Drafting Machine is the product of years of study, experiment and practical experience; it offers a perfected method of reducing drafting time and effort to a minimum.

The functions of T-square or straightedge, triangles, scales and protractor are all combined in one convenient unit, controlled entirely by the left hand. The right hand is thus left free for drawing; there is no waste effort nor interruption as the drawing grows.

In operation, while the control head and the scales may be moved freely to any point on the board, the scale assembly moves in parallel motion only. Thus when the machine is set so that one scale is horizontal and the other vertical, the draftsman has a T-square horizontal and a triangle vertical, ready for instant use at any point on his drawing.

When any of the "triangle angles" are required, the scale assembly is instantly shifted and snapped into place at any unit multiple of 15 degrees. The scale assembly is released by a light tangent pressure on the control ring which extends around the control knob and is easily operated by a touch of thumb or finger. The process of making this shift is so simple and natural that it becomes almost automatic.

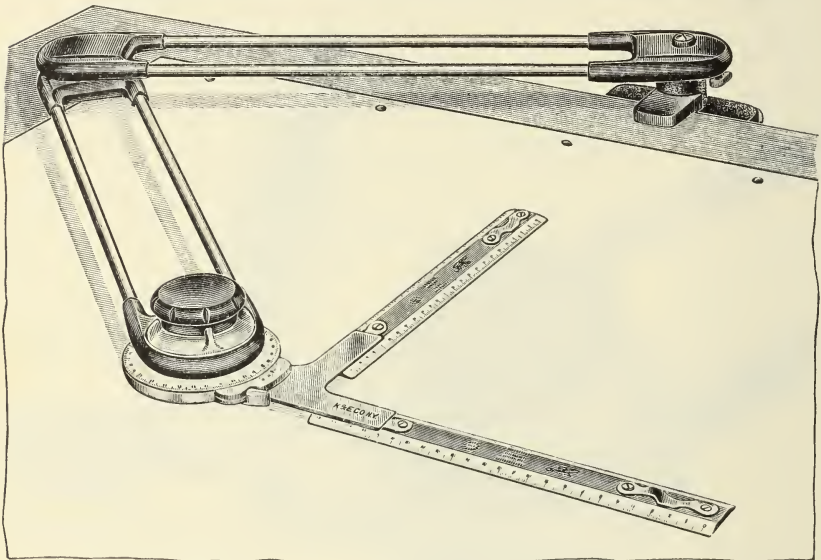
Work at any odd angle is easily performed with the aid of the full circle protractor on the control head. The scale assembly can be set with vernier accuracy and locked at any desired angle by releasing the thumb lever on the control head.

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PARAGON DRAFTING MACHINE

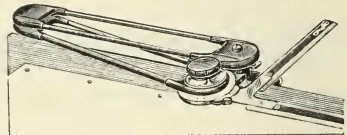
REG. U. S. PAT. OFF.

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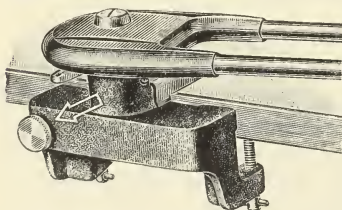


The scale assembly may be shifted without changing the zero setting of the protractor, by releasing the lever on the anchor where the machine is fastened to the drawing board. This adjustment is used to align the scales to the base of a new drawing. Since this adjustment has a range of 180 degrees, the scales may be set to operate from any oblique base with a zero setting of the protractor.

The clamp pad at the anchor occupies less than three square inches of the drawing board area. It forms a padded resting place for out-of-the-way parking of the machine when it is not in use. The machine need not be removed when changing drawings.



Because of the open arm construction, tension of the bands is not disturbed when the head is lifted or twisted. Paragon bands rarely require adjustment or replacement.



To prevent the machine from sliding on an inclined board, there is a leaf spring counterbalance in the anchor head, which is easily adjusted with a thumbscrew for any tilt of the board. The freedom of motion is not impeded since no brake is used. For steeply inclined boards (over 10 degrees) or vertical boards, our counterweighted machine No. 1370-2 or 1370-3 is recommended. See page 143.

Scales are available in a wide variety of graduations suitable for any type of work. All are interchangeable and easily applied. See pages 146 and 147.

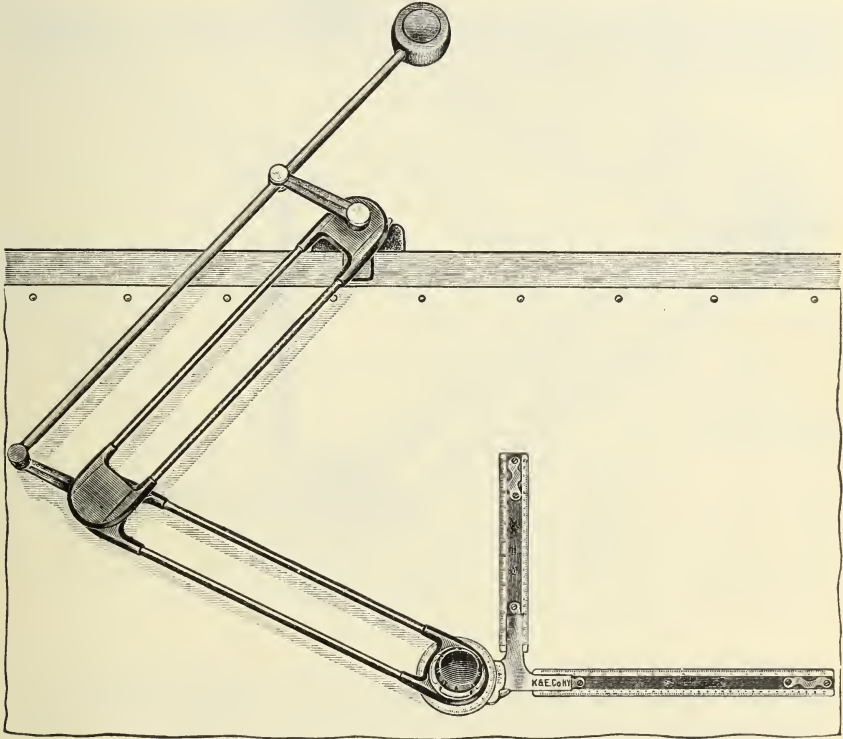
1370. K & E Paragon Drafting Machine; 24 inch arms; suitable for drawings up to 36 x 60 in.; $4\frac{3}{4}$ inch protractor, with vernier reading to five minutes of arc; with complete instructions for mounting and use. Price does not include scales. Also available with 30 inch arms, suitable for drawings up to 48 x 70 in.

KEUFFEL & ESSER CO., NEW YORK

PARAGON DRAFTING MACHINES

REG. U. S. PAT. OFF.

WITH COUNTERBALANCE WEIGHT



The Paragon Drafting Machine with counterbalance weight is like the machine described on the two previous pages except for the method of counterbalancing.

The counterbalance weight in this machine automatically compensates for the weight of the arms in any position, so that the head will maintain its place for any inclination of the board from horizontal to vertical.

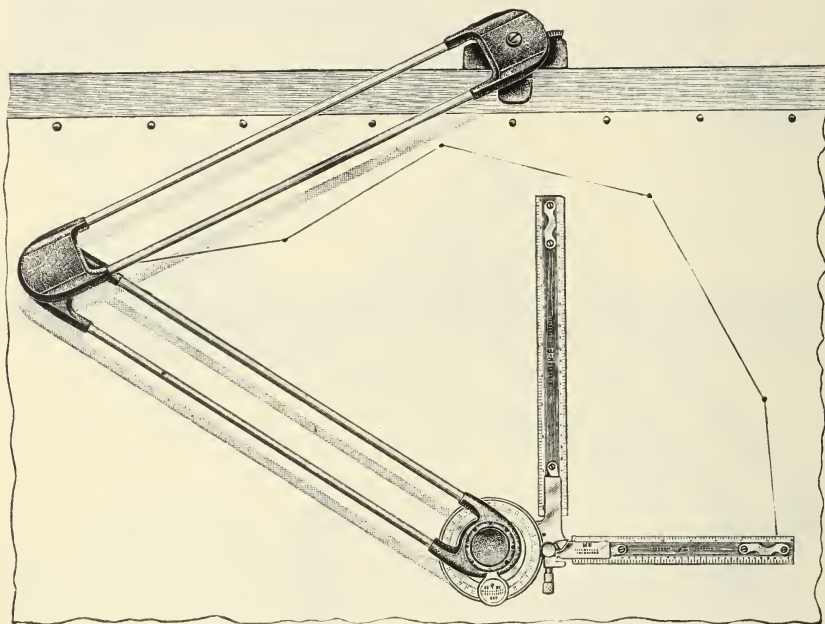
1370-2. Paragon Drafting Machine with counterbalance weight; 24 in. arms; suitable for drawings up to 36 x 60 in.; $4\frac{3}{4}$ in. protractor with vernier reading to five minutes of arc; with complete instruction for mounting and use. Price does not include scales.

1370-3. Paragon Drafting Machine with counterbalance weight; of extra sturdy construction; 30 in. arms; with balanced control head; suitable for drawings up to 48x70 in.; $4\frac{3}{4}$ in. protractor with vernier reading to five minutes of arc; with complete instructions for mounting and use. Price does not include scales.

KEUFFEL & ESSER CO., NEW YORK

PARAGON MAPPING MACHINE

REG. U. S. PAT. OFF.



No. N1371 with Scales

The improved PARAGON Mapping Machine is designed specifically for rapid and accurate map making. It functions on the drawing board in the same manner as a transit in the field, thus greatly facilitating the reduction of field notes in developing the map.

This instrument is essentially (1) a protractor which can be oriented as desired and carried by parallel motion to any desired point on a large drawing board; and (2) a pair of ruling scales which can be revolved to any angular position desired, the exact angle being indicated on the protractor and vernier.

The 5 inch protractor is engine divided to half-degrees, is numbered 0-360 for angles in azimuth and also 0-90-0-90-0 for bearings. It is of non-tarnishing metal and is protected by a transparent plastic plate.

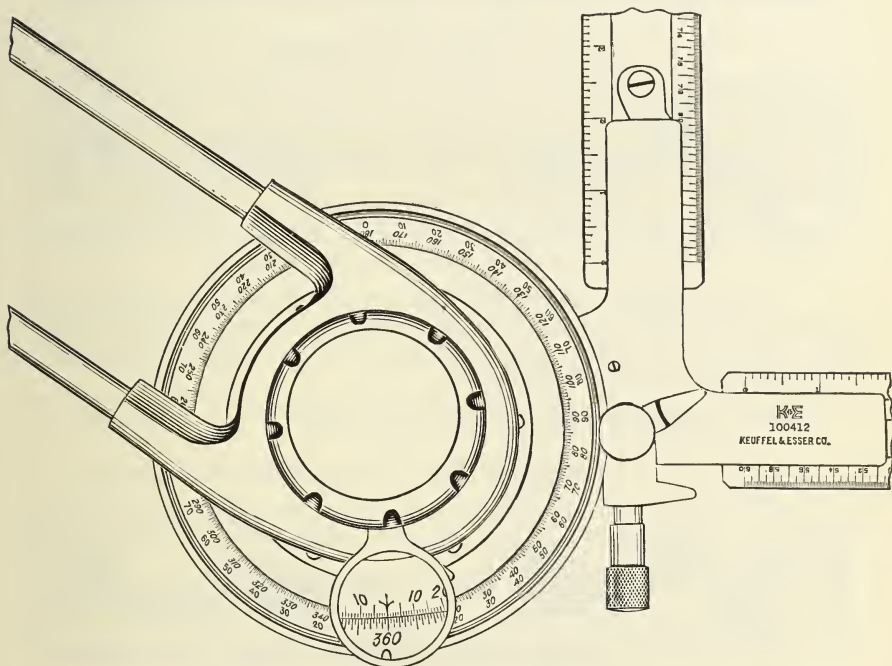
The double-direct vernier remains always in the most convenient reading position in the lower right quadrant of the protractor head. It is never obscured. With the aid of a slow motion screw and an adjustable magnifier, protractor angles can be read or set at the vernier to the nearest one minute of arc.

KEUFFEL & ESSER CO., NEW YORK

PARAGON MAPPING MACHINE

REG. U. S. PAT. OFF.

(CONTINUED)



The Control Head

Ruling scales are available graduated to suit the scale of the map, as listed and described on pages 146 and 147 of the Catalog.

In operation the protractor zero is first set and held to the vernier zero, then one of the ruling scales is aligned to the meridian line of the map. A clamp is set. The protractor is now oriented, and the head may be moved to any point on the board, without changing the orientation of the protractor. The ruling scales can be revolved to any desired azimuth angle or bearing, ready for drawing the traverse line in the position, direction and length indicated by the field notes.

This machine shares with the PARAGON Drafting Machine such features of time-saving, convenience, and long life, as:- open center arm construction, flexibility, uniform permanent band-tension, precision bearings, small anchor mounting, easy "parking", high grade construction throughout.

N1371. PARAGON Mapping Machine, 30 inch arms, suitable for maps up to 48x70 inches; 5 inch protractor, vernier reading to one minute; instructions for mounting and use. Price does not include scales.

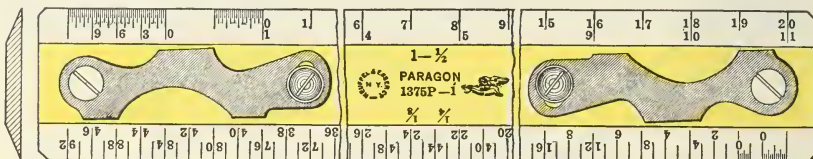
KEUFFEL & ESSER CO., NEW YORK

SCALES FOR **PARAGON**

REG. U. S. PAT. OFF.

DRAFTING AND MAP MAKING MACHINES

PARAGON SCALES

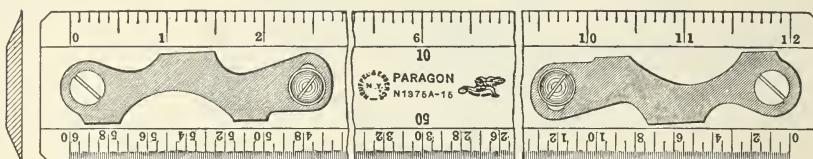


No. 1375P-1, an Architects' Scale—Paragon.

Paragon Scales are made of fine quality boxwood, carefully seasoned and selected, with engine divided graduations on high grade white plastic facings. The excellent workmanship and finish of Paragon scales has made them universal favorites for over fifty years.

See the following page for list of Paragon scales.

ALUMINUM SCALES



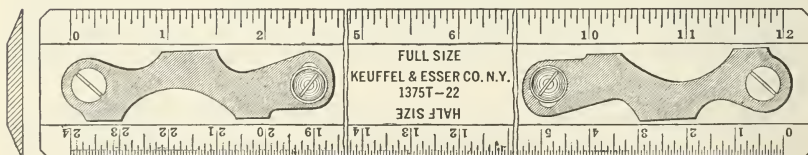
No. N1375A-15, an Engineers' Scale—Aluminum.

Natural anodized aluminum scales are strong, rigid, dimensionally stable, and long lasting.

See the following page for list of aluminum scales.

LUXYLITE SCALES

TRADE MARK



No. 1375T-22, a Mechanical Draftsmen's Scale—Luxylite.

These scales are made of a newly developed transparent plastic material with a high degree of dimensional stability. The graduations are engine divided on the bottom of the scale so that they are in actual contact with the work, avoiding the possibility of parallax errors.

See the following page for list of Luxylite scales.

KEUFFEL & ESSER CO., NEW YORK

SCALES FOR PARAGON

REG. U. S. PAT. OFF.

DRAFTING AND MAP MAKING MACHINES (CONTINUED)

GRADUATION OF SCALE		Length Inches	PARAGON	LUXYLITE TRANSPARENT PLASTIC	ALUMINUM NATURAL ANODIZED
1st EDGE	2nd EDGE				
$\frac{1}{8}$ & $\frac{1}{4}$ in. to 1 ft.	$\frac{1}{2}$ & 1 in. to 1 ft.	12 18	1375P-1 1376P-1	1375T-1 1376T-1	N1375A-1 N1376A-1
$\frac{3}{8}$ & $\frac{3}{4}$ in. to 1 ft.	$1\frac{1}{2}$ & 3 in. to 1 ft.	12 18	1375P-2 1376P-2	1375T-2 1376T-2	N1375A-2 N1376A-2
$\frac{1}{8}$ in. to 1 ft.	$\frac{1}{4}$ in. to 1 ft.	12 18	1375P-7 1376P-7	1375T-7 1376T-7	
$\frac{3}{8}$ in. to 1 ft.	$\frac{3}{4}$ in. to 1 ft.	12 18	1375P-8 1376P-8		
$\frac{1}{2}$ in. to 1 ft.	1 in. to 1 ft.	12 18	1375P-9 1376P-9	1375T-9 1376T-9	
$1\frac{1}{2}$ in. to 1 ft.	3 in. to 1 ft.	12 18	1375P-10 1376P-10		
10 parts to 1 in.	50 parts to 1 in.	12 18	1375P-15 1376P-15	1375T-15 1376T-15	N1375A-15 N1376A-15
20 parts to 1 in.	40 parts to 1 in.	12 18	1375P-16 1376P-16		
30 parts to 1 in.	60 parts to 1 in.	12 18	1375P-17 1376P-17		
† Full size to 50ths in.	Full size to 32ds in.	12 18	1375P-19 1376P-19	1375T-19 1376T-19	N1375A-19 N1376A-19
Full size to 16ths in.	$\frac{1}{2}$ size to 16ths in.	12 18	1375P-22 1376P-22	1375T-22 1376T-22	N1375A-22 N1376A-22
Full size to 32ds in.	$\frac{1}{2}$ size to 16ths in.	12 18	1375P-23 1376P-23	1375T-23 1376T-23	N1375A-23 N1376A-23
Millimeters	$\frac{1}{2}$ size to 1 mm.	12 18	1375P-25 1376P-25		
STRAIGHTEDGES					
Straightedge, ungraduated with one chuck plate only		12	1379-12*	1379T-12	
		18	1379-18*	1379T-18	
		24	1379-24*		

* These straightedges are maple with transparent xylonite linings. Their construction is the same as that of the T-square blades described on p. 178.

† Scale graduated like No. 1449PR. See page 155.

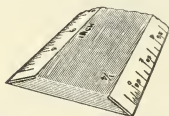
KEUFFEL & ESSER CO., NEW YORK

MEASURING SCALES

Since almost every line drawn on a mechanical drawing or map must be of measured length, measuring scales are in constant use on the drawing board. Obviously, the selection of the scale best suited to the purpose is an important economy. Having studied this problem for many years K & E offers a wide variety of scales which ideally meet almost every requirement and preference. K & E Paragon engine divided scales are U. S. standard, of the best selected materials of proper width and thickness, and of finest finish. The purchaser of any of these K & E made scales may rest assured that he has an instrument of high quality and accuracy.

SCALE SHAPES

Standard scales are made in four shapes, as follows;-



1. **Two-bevel scale.** Has the advantage of a wide base, and scale faces always visible.



2. **Opposite bevel scale.** Has the advantage of easy handling — easily lifted from board by tilting.



3. **Four-bevel scale.** Used mostly as a pocket scale. Convenient, because it has four faces on one small rule.



4. **Triangular scale.** A combination scale with six faces.

MATERIALS AND CONSTRUCTION

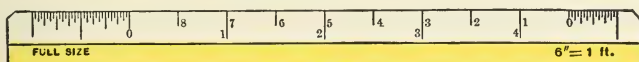
Scales designated "Paragon" are made of high grade boxwood with scale faces of white plastic permanently cemented. Graduations are engine divided with a high degree of accuracy, filled with dense permanent black pigment, so that they stand out strongly against the white background.

KEUFFEL & ESSER CO., NEW YORK

SCALE GRADUATIONS

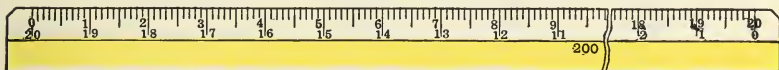
The objects to be represented on the drawing board vary from the smallest machine parts to large area maps. A large variety of scales are required. For convenience scales are classified according to their most common uses as follows:

1. **Mechanical Draftsmen's Scales.** Most common ranges, full size, and $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$ inches to 1 inch. These are called "size" scales.



A double divided Mechanical Draftsmen's Open Divided Scale.

2. **Architects' Scales.** Most common ranges, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, and 4 inches to 1 foot.
3. **Engineers' Scales.** Used mostly where large reductions are required such as for making maps and charts. The customary designation is in feet to the inch. Scales are divided decimally, 10, 20, 30, 40, 50 and 60 units per inch, but numbered on the basis of 10 units in each case.



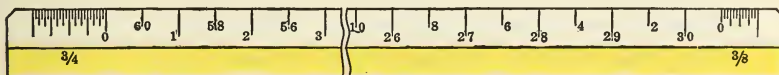
A double numbered Engineers' Fully Divided or Chain Scale.

Two general types of scale in common use are Open Divided Scales, and Fully Divided or Chain Scales.

OPEN DIVIDED SCALES

Open divided scales have the main units only graduated but with an extra unit fully subdivided in the opposite direction from the zero point.

When the subdivided unit represents **one foot** as in Architects' Scales, the ultimate division is in multiples and fractions of 12 representing inches.



A double divided Architects' Open Divided Scale.

When the subdivided unit represents **one inch** as in Mechanical Draftsmen's Scales, the ultimate division represents $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$ etc. of an inch.

Open divided scales often have two scales on one face, one double the other and reading in opposite directions. While this system increases the variety of scales available in one unit, singly divided scales are somewhat easier to read.

FULLY DIVIDED OR CHAIN SCALES

Fully divided scales have the advantage of reading several values from the same origin without resetting. They are sometimes double numbered, either to provide both right-to-left and left-to-right reading, or to provide two different scales on one face. Engineers' fully divided scales are often called Chain Scales.

KEUFFEL & ESSER CO., NEW YORK

SPECIAL SCALES

Made to Customer's Specifications

Special scales can be made to order. In writing for a quotation please state:

1. Quantity of scales which will be required.
2. Material. Paragon (graduations on white xylonite).
3. Graduated length over-all.
4. Shape:



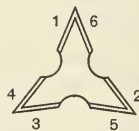
Two-bevel



Opposite bevel



Four-bevel



Triangular

Numbering of bevels looking at left end of scales.

5. Description of graduations required on **each bevel**. (Numbered from 1 up as in above sketches).

- a. On bevels which are to be like any scale illustrated herein give K&E catalog number (upper or lower scale in illustration).
- b. If the scale is special, supply a sketch or description, which should include:

Whether mechanical draftsmen's, architects', or engineers' style. (Page 149).

Whether open-divided or fully divided. (Page 149).

What scale reduction, reading from left to right, e.g.

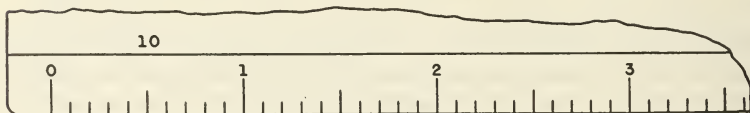
$\frac{1}{4}$ in. = 1 ft., $\frac{1}{2}$ size, 1 in. = 1 mile, etc.

What scale reduction, reading from right to left, if any.

Whether regular or "face reading", ("face reading" means numbers arranged for reading the lower rather than the upper edge of the scale).

Fineness of ultimate graduations.

Numbering, e.g., "0 to 46 by 2s".



Face Reading Scale.

KEUFFEL & ESSER CO., NEW YORK

FLAT PARAGON SCALES

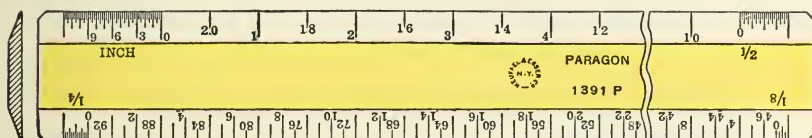
REG. U. S. PAT. OFF.

ARCHITECTS' — OPEN DIVIDED

Each Scale Stamped "Paragon".

Paragon Scales are made of the best grade seasoned boxwood. The beveled faces are covered with high grade white plastic permanently cemented. **Engine divided** graduations are black filled, offering strong contrast on the white background.

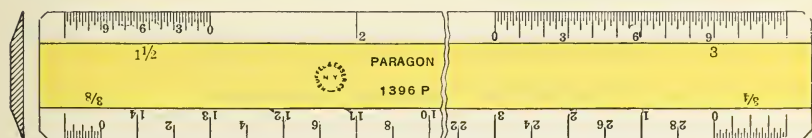
Two Bevels



No. 1391 P.

- 1390 P. Flat Paragon Scale, 6 in. divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 in. to the foot.
 1391 P. " " " 12 " " " " " " " " " "
 1391 PA. " " " 12 " " $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{3}{4}$ in. to the foot.
 *1391 PB. " " " 12 " " $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{4}$, $1\frac{1}{2}$ " " " "
 1392 P. " " " $12\frac{1}{2}$ " " $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 " " " "

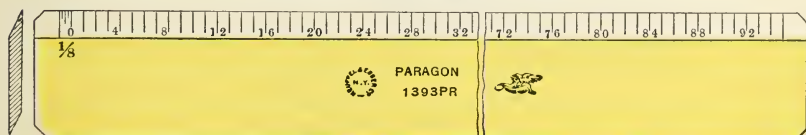
Scale No. 1392P has the advantage of covering 100 feet on $\frac{1}{8}$ inch, 50 feet on $\frac{1}{4}$ inch, and 25 feet on $\frac{1}{2}$ inch scale.



No. 1396 P.

- 1396 P. Flat Paragon Scale, 12 in. divided $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 in. to the foot.

Bevels on Opposite Sides.



No. 1393 PR.

- 1391 PR. Flat Paragon Scale, 12 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 in. to the foot.
 1393 PR. " " " " " " $\frac{1}{8}$, $\frac{1}{4}$ in. to the foot.



FLAT PARAGON SCALES

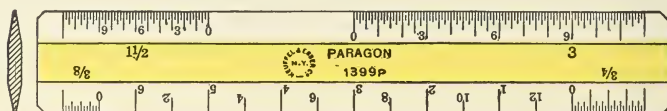
REG. U. S. PAT. OFF.

(CONTINUED)

ARCHITECTS' — OPEN DIVIDED

Each Scale Stamped "Paragon".

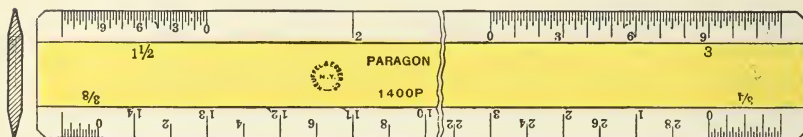
Four Bevels.



No. 1399 P.

- 1399 P.** Flat Paragon Scale, 6 in.; divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 3 in. to the foot; in leather Sheath.

Scale No. 1399P. is less than one inch wide and very convenient for the pocket. It has all the usual scales employed by the building professions.

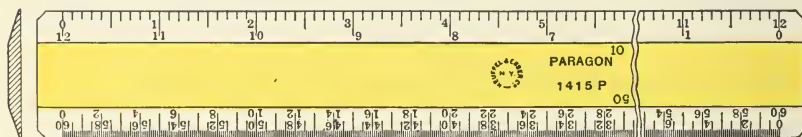


No. 1400 P.

- 1400 P.** Flat Paragon Scale, 12 in.; divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 3 in. to the foot.

ENGINEERS' — CHAIN SCALES

Two Bevels — Double Numbered.



No. 1415 P.

- | | | | | |
|----------------|---------------------|--------|---------|------------------------------|
| 1410 P. | Flat Paragon Scale, | 6 in.; | divided | 10 and 50 parts to the inch. |
| 1411 P. | " | " | " | 20 and 40 " " " " |
| 1412 P. | " | " | " | 30 and 60 " " " " |
| 1413 P. | " | " | " | 80 and 100 " " " " |
| 1415 P. | " | " | " | 10 and 50 " " " " |
| 1416 P. | " | " | " | 20 and 40 " " " " |
| 1417 P. | " | " | " | 30 and 60 " " " " |
| 1418 P. | " | " | " | 80 and 100 " " " " |



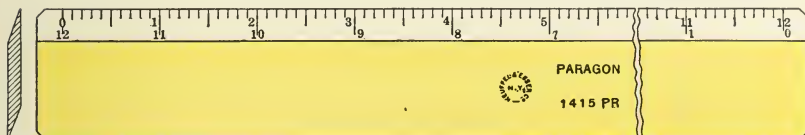
FLAT PARAGON SCALES

REG. U. S. PAT. OFF.
(CONTINUED)

ENGINEERS' — CHAIN SCALES

Each Scale Stamped "Paragon".

Bevels on Opposite Sides — Doubled Numbered.



No. 1415PR

*1415PR. Flat Paragon Scale, 12 in.; divided 10 and 50 parts to the inch.

*1416PR. " " " , 12 in.; " 20 " 40 " " " "

Four Bevels — Double Numbered.



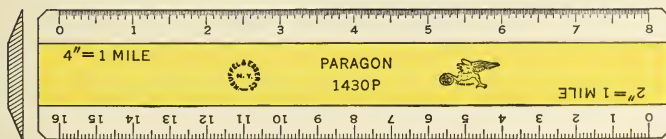
No. 1419 P.

1419 P. Flat Paragon Chain Scale, 6 in.; divided 10, 30, 40 and 50 parts to the inch; in leather Sheath.

1420 P. Flat Paragon Chain Scale, 6 in.; divided 10, 20, 40 and 50 parts to the inch; in leather Sheath.

Scales Nos. 1419P and 1420P are less than one inch wide and very convenient for the pocket.

Two Bevels.



No. 1430P.

1430 P. Flat Paragon Chain Scale, 6 in.; divided 2 in. to the mile (smallest division 100 ft.) and 4 in. to the mile (smallest division 20 ft.).



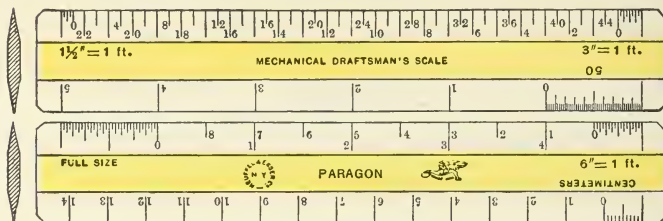
FLAT PARAGON SCALES REG. U. S. PAT. OFF.

(CONTINUED)

MECHANICAL DRAFTSMEN'S—OPEN DIVIDED

Each Scale Stamped "Paragon".

Four Bevels.



1442P. Flat Paragon Scale, 6 in. In leather sheath.

Full size, inches reading to 32nds.

Half size (6 in.=1 ft.) inches reading to 16ths.

Quarter size (3 in.=1 ft.) inches reading to 8ths.

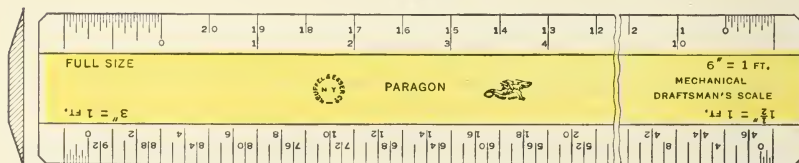
Eighth size (1 1/2 in.=1 ft.) inches reading to 4ths.

Full size, inches reading to 50ths.

Centimeters reading to millimeters.

Scale No. 1442P is very convenient for the pocket or for small work on the drawing board.

Two Bevels.



1444P. Flat Paragon Scale, 12 in.

Full size, inches reading to 32nds.

Half size (6 in.=1 ft.) inches reading to 16ths.

Quarter size (3 in.=1 ft.) inches reading to 8ths.

Eighth size (1 1/2 in.=1 ft.) inches reading to 4ths.



FLAT PARAGON SCALES

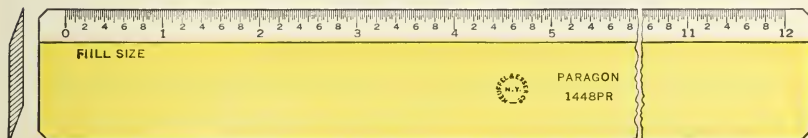
REG. U. S. PAT. OFF.

(CONTINUED)

MECHANICAL DRAFTSMEN'S — FULLY DIVIDED

Each Scale Stamped "Paragon".

Bevels on Opposite Sides.



No. 1448PR*

1448PR. Flat Paragon Scale, 12 in.

* Full size, inches reading to 50ths, left to right.

* Full size, inches reading to 50ths, right to left.

1449PR. Flat Paragon Scale, 12 in.

* Full size, inches reading to 50ths.

Full size, inches reading to 32nds.

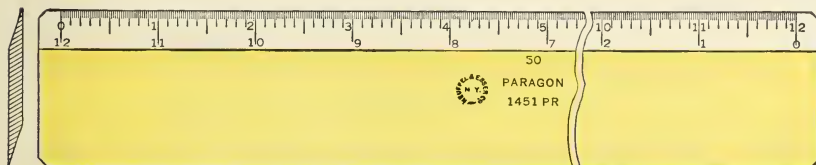
* This scale is as suggested by the Society of Automotive Engineers in the "SAE Aeronautical Drafting Manual". Each tenth of an inch is divided into fifths by four lines, the second and third of which are longer than the first and fourth.

1450PR. Flat Paragon Scale, 12 in.

Full size, first inch divided 32 parts to inch;
next 11 inches divided 16 parts to inch.

Full size, first inch divided 50 parts to inch;
next 11 inches divided 10 parts to inch.

This style scale has been standardized by the engineering departments of many leading automobile manufacturers.



No. 1451PR.

1451PR. Flat Paragon Scale, 12 in.; double numbered.

Full size, inches reading to 50ths.

Full size, inches reading to 32nds.

1453PR. Flat Paragon Scale, 12 in.

Full size, inches reading to 16ths.

Full size, inches reading to 32nds.

1455PR. Flat Paragon Scale, 12 in.; double numbered.

Full size, inches reading to 32nds.

Half size, inches reading to 16ths (1/32 inch actual).



FLAT PARAGON SCALE

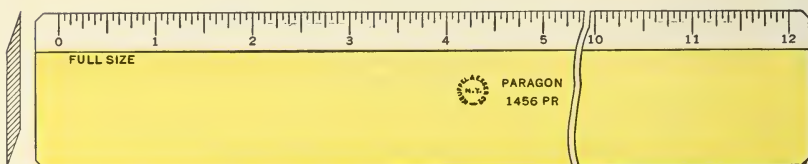
REG. U. S. PAT. OFF.

(CONTINUED)

MECHANICAL DRAFTSMEN'S — FULLY DIVIDED

Each Scale Stamped "Paragon".

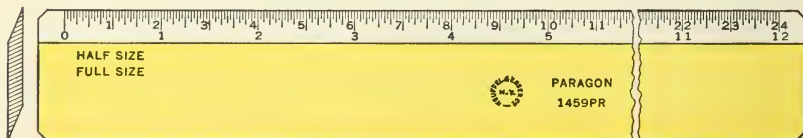
Bevels on Opposite Sides.



No. 1456PR.

- 1456PR.** Flat Paragon Scale, 12 in.
 Full size, inches reading to 16ths.
 Half size, inches reading to 16ths (1/32 inch actual).

- 1457PR.** Flat Paragon Scale, 12 in.
 Half size, inches reading to 16ths (1/32 inch actual).
 Quarter size, inches reading to 8ths (1/32 inch actual).



No. 1459PR.

- 1459PR.** Flat Paragon Scale, 12 in.; numbered in black and red left to right.
 All divisions 1/32 inch actual.
 Full size in black, inches reading to 32nds.
 Half size in red, inches reading to 16ths.
 Quarter size in black, inches reading to 8ths.
 Eighth size in red, inches reading to 4ths.

Four different scales on one unit, each scale easily identified by the color of the numbers.

Refer to page 154 for Open Divided Mechanical Draftsman's Scale.



FLAT PARAGON SCALES

REG. U. S. PAT. OFF.

(CONTINUED)

METRIC

All Paragon Scales Stamped "Paragon".

Two Bevels.

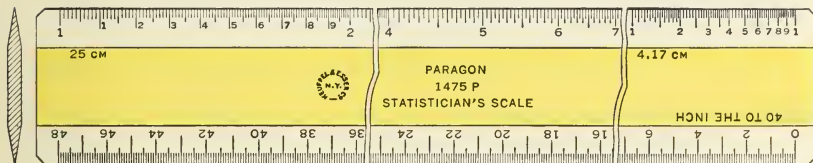


No. 1462 P.

- 1460 P. Flat Paragon Scale, Metric; 10 cm.; centimeters reading to millimeters, and centimeters reading to half-millimeters.
- 1461 P. Like No. 1460P but 20 cm. long.
- 1462 P. " " " " 30 cm. "
- *1463 P. " " " " 50 cm. "
- 1472 P. Flat Paragon Scale, 12 in.; full size; inches reading to 32nds, and 30 centimeters reading to half-millimeters.
- 1473 P. Flat Paragon Scale, 20 in.; full size; inches reading to 32nds, and 50 centimeters reading to half-millimeters.

STATISTICIANS'

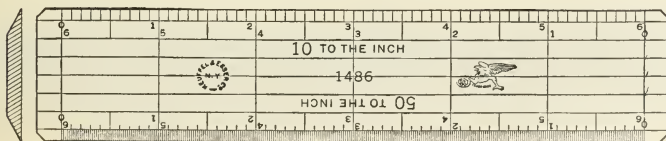
Four Bevels.



No. 1475 P.

- *1475P. Flat Paragon Statisticians' Scale 12 in.
5 Complete Logarithmic Scales, one each:-
4.17 cm., 6.25 cm., 10 cm., 12.5 cm. and 25 cm.
1 Metric Scale, 30 cm. reading to millimeters.
1 12 Inch Scale, 40 to the inch.

UNDERWRITERS'



No. 1486.

- 1486. Underwriters' Scale, transparent plastic, 6 in.; double numbered; full size; inches reading to 10ths and inches reading to 50ths. The inch lines extend the full width of the scale.
- 1486½. Like No. 1486 but with both scales inches reading to 10ths.

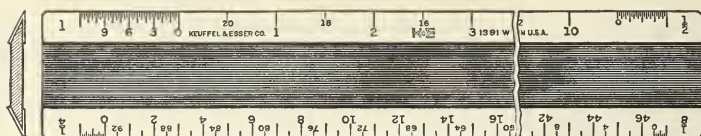


FLAT ALL-PLASTIC SCALES

K & E All-Plastic Scales, though not engine divided, have accurate, clear black graduations on white bevels.

ARCHITECTS' — OPEN DIVIDED

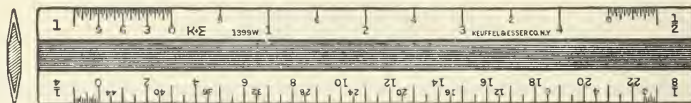
Two Bevels.



No. 1391W.

1391W. Flat All-Plastic Scale, 12 in.; divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 in. to the foot.

Four Bevels.



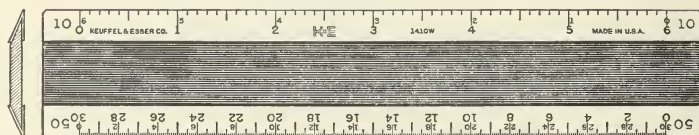
No. 1399W.

1399W. Flat All-Plastic Scale, 6 in.; divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 1/2 and 3 in. to the foot, in sewed Sheath.

1400W. Flat All-Plastic Scale, 12 in.; divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 1/2 and 3 in. to the foot.

ENGINEERS' CHAIN SCALES

Two Bevels.



No. 1410W.

1410W. Flat All-Plastic Scale, 6 in.; divided 10 and 50 parts to the inch.

1415W. Flat All-Plastic Scale, 12 in.; divided 10 and 50 parts to the inch.



FLAT ALL-PLASTIC SCALES

(CONTINUED)

ENGINEERS' — CHAIN SCALES

Four Bevels.

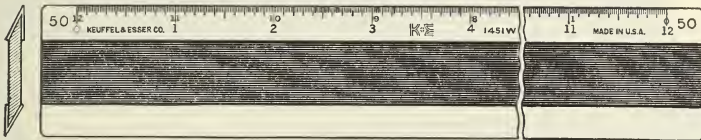


No. 1419W.

- 1419W.** Flat All-Plastic Scale, 6 in.; divided 10, 30, 40, and 50 parts to the inch; in sewed Sheath.
- 1420W.** Flat All-Plastic Scale, 6 in.; divided 10, 20, 40 and 50 parts to the inch; in sewed Sheath.

MECHANICAL DRAFTSMEN'S — FULLY DIVIDED

Bevels on Opposite Sides.

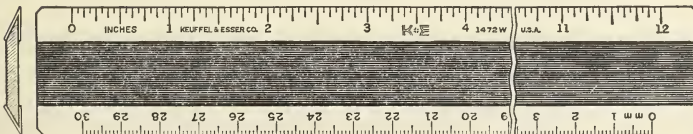


No. 1451W.

- 1451W.** Flat All-Plastic Scale, 12 in.; double numbered.
Full Size, inches reading to 50ths.
Full Size, “ “ “ “ 32nds.
- 1453W.** Flat All-Plastic Scale, 12 in.
Full Size, inches reading to 16ths.
Full Size, “ “ “ “ 32nds.
- 1456W.** Flat All-Plastic Scale, 12 in.
Full Size, inches reading to 16ths.
Half Size, “ “ “ “ (1/32 actual).

METRIC — ENGLISH

Two Bevels.



No. 1472W.

- 1470W.** Flat All-Plastic Scale, 15 cm.; divided centimeters to millimeters and inches to 16ths.
- 1472W.** Flat All-Plastic Scale, 30 cm.; divided centimeters to millimeters and inches to 16ths.

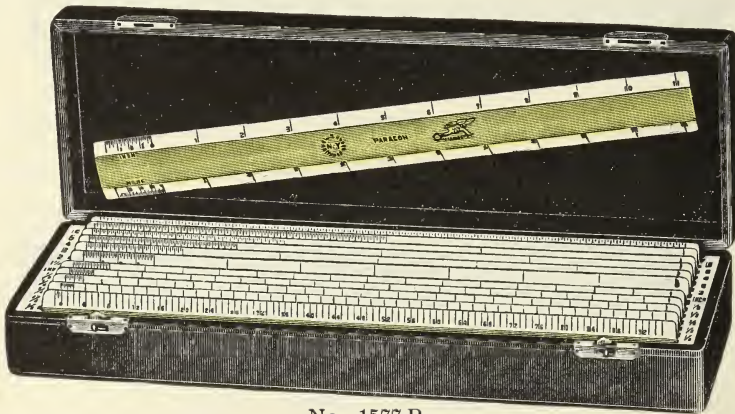
KEUFFEL & ESSER CO., NEW YORK

FLAT PARAGON SCALES IN SETS

REG. U. S. PAT. OFF.

A complete set of scales well protected in a durable case, with each scale available for instant selection is a great convenience in the drafting room, particularly when the class of work calls for various scale reductions. Most of the scales offered in these sets have a single scale reduction per unit, divided right-to-left on one face and left-to-right on the other, thus offering maximum convenience when working to any particular scale.

The cases are of wood, leatherite covered, with a space for each scale. Each compartment is numbered with the scale size at each side, so that the desired scale may be instantly selected. The protection offered by carrying scales in a case will assure their being kept in good condition and will add greatly to their useful life.



No. 1577 P.

ARCHITECTS'—OPEN DIVIDED

In the sets listed below, each scale unit has the same scale reduction on both edges, reading from left-to-right and right-to-left.

- 1575 P. Set of 4 Paragon Scales, 12 in. divided:- $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 in. to the ft.
 1576 P. Set of 8 Paragon Scales, 12 in. divided:- $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 ins. to the ft.
 1577 P. Set of 12 Paragon Scales, 12 in. divided:- $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2, 3, 4, 6 in. to the ft. and full size, inches reading to 16ths.

ENGINEERS'—CHAIN SCALES

On No. 1584P each scale unit has two scale reductions, one on each edge. All scales are double numbered, reading from left-to-right and right-to-left.

- 1584 P. Set of 4 Paragon Scales, 12 in. divided:- 10, 20, 30, 40, 50, 60, 80, 100 parts to the inch.

In the sets listed below, each scale unit has the same scale reduction on both edges, reading from left-to-right and right-to-left.

- 1592 P. Set of 6 Paragon Scales, 12 in. divided:- 10, 20, 30, 40, 50, 60 parts to the inch.
 1593 P. Set of 8 Paragon Scales, 12 in. divided:- 10, 20, 30, 40, 50, 60, 80, 100 parts to the inch.

METRIC

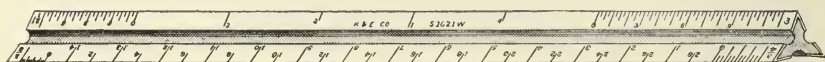
*In this set each unit has the same scale on both edges, reading from left-to-right and right-to-left.

- 1598 P. Set of 6 Paragon Scales, 30 cm.
 divided metric measure: .01, .02, .03 .05, .025, .0125

KEUFFEL & ESSER CO., NEW YORK

TRIANGULAR ALL-PLASTIC SCALES

K & E All-Plastic Scales. though not engine divided, have accurate, clear black graduations on white bevels.



No. 1621 W.

ARCHITECTS'—OPEN DIVIDED

1621 W. 12 in., divided $\frac{2}{3}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 in. to the foot, $\frac{1}{16}$ in.

ENGINEERS'—CHAIN SCALE

1631 W. 12 in., divided 10, 20, 30, 40, 50, 60 parts to the inch.

METRIC—FULLY DIVIDED

1655 W. 30 cm, divided 1:100, 1:80, 1:50, 1:40, 1:33 $\frac{1}{3}$, 1:20.

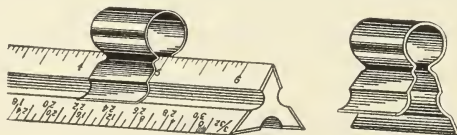
SHEATH FOR SCALES



1668 B. Sheath for 12 in. Triangular scale. Stout cardboard, lined with velvet.

SCALE GUARD

This convenient clip not only serves as a means of lifting the scale, but also helps to identify the scale which is being used. Fits all K & E triangular scales.



No. 1669.

1669. Scale Guard, nickel silver, for Triangular Scales.



PROTRACTOR SCALE

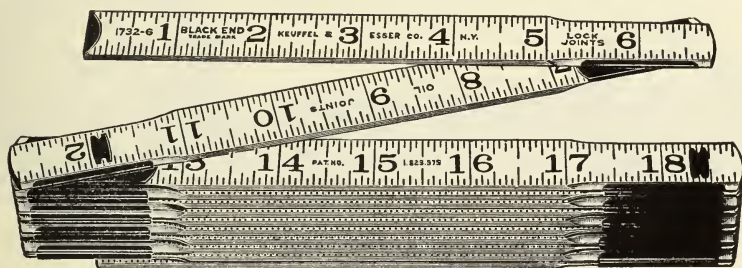


No. 1670.

1670. Protractor Scale, steel, bright graduations on black background, $5\frac{1}{8} \times 1$ in., one edge graduated in inches to 16ths, the other edge in inches to 10ths, both numbered 0 to 5 inches. Protractor at one end, graduated to 5 degrees from 0 to 90 degrees and numbered at every 20 degrees.

FOLDING POCKET WOOD RULES

SPRING JOINTS, HARDWOOD, $\frac{5}{8}$ IN. WIDE.



No. 1731-6.

“BLACK END” FOLDING RULES, are of highest quality. Each joint has a steel spring and an additional locking device. Numbers and graduations are protected by a strike plate on the surface of each member which prevents the adjacent members from rubbing against each other.

1731-6. Folding Rule, Yellow Finish, 72 inches 12 fold, div. $\frac{1}{16} \times \frac{1}{16}$ in., metal tips.

1732-6. Folding Rule, White Finish, 72 inches 12 “ “ $\frac{1}{16} \times \frac{1}{16}$ “ “ “

1732-6D. Folding Rule, White Finish, 6 ft., 12 “ “ $\frac{1}{16}$ in. $\times \frac{1}{100}$ ft. “ “

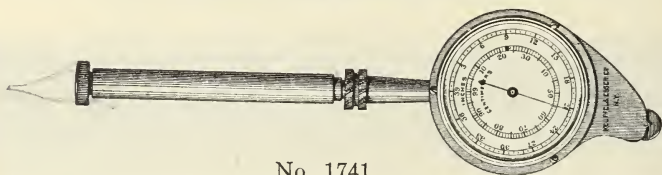
No. 1732-6D has foot marks in red and “ready reading” subdivisions.

1734-6. Folding Rule, White Finish, 72 inches, 12 fold, div. $\frac{1}{16} \times \frac{1}{16}$ in., metal tips.

Numbering begins on the inside face at both ends instead of the outside face as in the illustration. This facilitates short measurements flat on the surface even with the rule only partially opened.

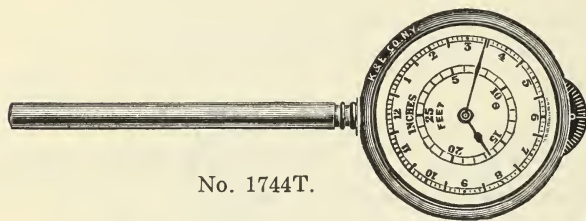
KEUFFEL & ESSER CO., NEW YORK

MAP MEASURES

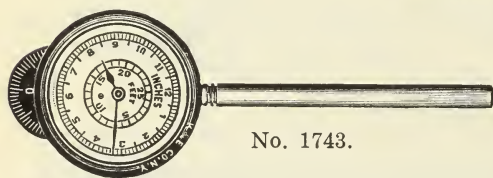


No. 1741.

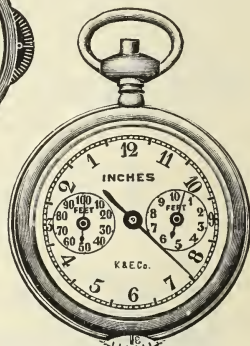
1741. **Map Measure**, 5 inches, has a swiveling metal handle with lock nut, dial about $1\frac{1}{8}$ in. diameter graduated in both English and metric systems. Reads up to 39 inches in $\frac{1}{2}$ in. intervals or up to 99 centimeters. The swiveling handle assists in the accurate measurements of broken and irregular lines.



No. 1744T.



No. 1743.



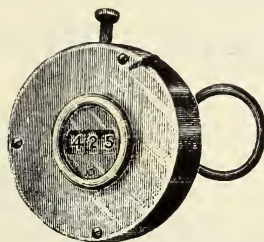
No. 1745.

1743. **Map Measure**, nickelplated, $1\frac{3}{8}$ in. diam., registers 25 feet in feet, inches and eighths inches on dial; but reads $\frac{1}{32}$ of an inch on the measuring wheel; long handle.
- 1744T. **Map Measure**, graduated like No. 1743, but $1\frac{1}{2}$ in. diam.; long handle.
- 1744D. **Map Measure**, nickelplated, similar to No. 1744T, registers 25 feet in feet, inches and tenths of inches on the dial; but reads to .05 inch on the measuring wheel; long handle.
1745. **Map Measure**, watch pattern, nickelplated, $1\frac{3}{8}$ in. diam., three numbered dials, registers 100 feet in feet, inches, and eighths inches on the dial, and $\frac{1}{32}$ of an inch on the measuring wheel, with device for setting back to zero; with directions.

To measure a line, the instrument is set to zero, and the wheel is run over the map. (the instrument being held perpendicularly) following closely the line or distance to be measured. The index hands on the dial will then indicate the length of the line in feet, inches and eighths or tenths inches; while the measuring wheel reads to $\frac{1}{32}$ or .05 of an inch.

KEUFFEL & ESSER CO., NEW YORK

TALLY REGISTERS



No. 1748.

1748. Tally Register, for keeping count by pressing on a knob; registers to 999, arranged to set back to zero.
1748X. Tally Register, like No. 1748 but registering to 9999.

PARALLEL RULES ROLLING TYPE

K & E Metal Rolling Parallel Rules are constructed to insure accuracy of motion, and are heavy and sturdy. The metal guard over the axle is shaped to form a convenient handle.



BRASS

1756. Parallel Rule, 12 in., weight about 2 lb.; in leatherite covered case.
1758. Parallel Rule, 18 " " " 3½ lb.; in leatherite covered case.

FOLDING TYPE EBONIZED BOXWOOD



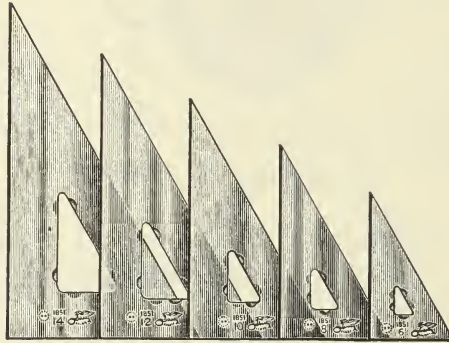
1797. Sigsbee's Patent Parallel Rule, Ebonized Boxwood, 18 in.

Parallel Rule No. 1797 has nickelplated brass mountings and the bars are so pivoted that the rule can be laid over (stepping) to cover any distance. Rubber disks, inserted in finger holds in the blades, insure additional friction of each blade upon the drawing surface when pressed down by the fingers.



LUXYLITE TRIANGLES

TRADE MARK



No. 1851

Made of a newly developed crystal clear plastic. The Luxylite Triangle has many advantages over other triangles. In addition to its transparency, the material is very stable, both dimensionally and chemically. It may therefore be depended upon to retain its original characteristics for a long period of time.

It is hard and is not easily scratched.

It is flexible, and is not easily cracked or broken.

It will not discolor nor become brittle with age.

It will not warp.

It is not easily affected by the atmospheric conditions of heat and humidity, encountered in tropical climates.

It is no fire hazard—is very slow-burning.

These characteristics make the Luxylite Triangle an excellent investment.

1851. Luxylite Transparent Triangles 30°-60°-90°.

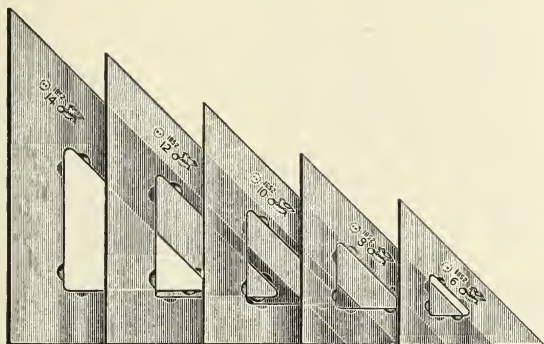
Height . . . in.	6	8	10	12	14
Thickness . . in.	.08	.08	.08	.10	.10

1852. Luxylite Transparent Triangles 45°-45°-90°.

Height . . . in.	6	8	10	12	14
Thickness . . in.	.08	.08	.10	.10	.10

KEUFFEL & ESSER CO., NEW YORK

XYLONITE TRIANGLES



No. 1856.

The transparent xylonite used for K & E xylonite triangles and other K & E xylonite products is a specially prepared form of nitrocellulose. It is transparent; it is fairly hard and not too easily scratched. It is uniform in composition, and does not readily warp. It is tough and flexible.

Under ordinary conditions and properly cared for, K & E xylonite triangles are capable of years of satisfactory use.

In selecting a pair of triangles, that is, one 30-60-90 and one 45-45-90 it is usually preferable to have the former two inches longer on the perpendicular. The 22½-67½-90 triangle is convenient for ruling guide lines for slanting lettering.

1855. Xylonite Triangles 30°-60°-90°.

Height . . . in.	4	6	7	8	8H	9	10	12	14	16	18
Thickness . . in.	.06	.06	.06	.06	.08	.06	.08	.08	.08	.10	.10

Note: When two thicknesses of the same height are available "H" indicates the heavier of the two.

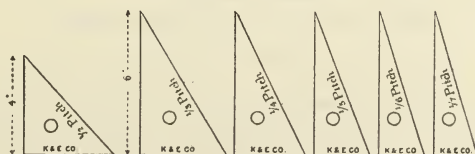
1856. Xylonite Triangles 45°-45°-90°.

Height . . . in.	4	6	7	8	8H	9	10	12	14	16	18
Thickness . . in.	.06	.06	.06	.06	.08	.06	.08	.08	.08	.10	.10

Note: When two thicknesses of the same height are available "H" indicates the heavier of the two.

1855-1. Xylonite Triangles 22½°-67½°-90°.

Height . . . in.	4	6	8	10	12
Thickness . . in.	.06	.06	.06	.08	.08

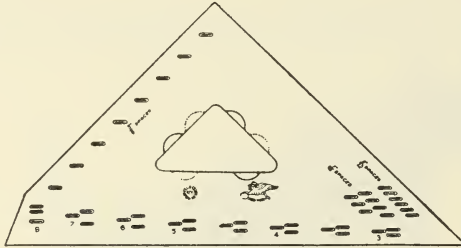


No. 1857 A.

1857A. Xylonite Transparent Triangles for roof pitches, 6 in set.

KEUFFEL & ESSER CO., NEW YORK

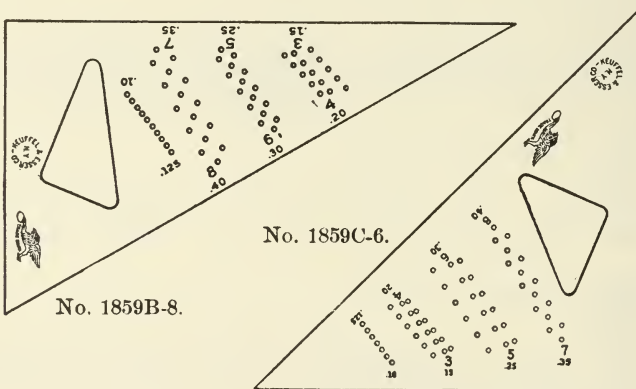
K & E LETTERING TRIANGLES



No. 1859A.

1859A. Luxylite (transparent) Lettering Triangle, 6 in., with Directions.

K & E Lettering Triangle No. 1859A has the form of a 6 inch, 45 degree triangle, with one 45 degree corner cut off to form an angle of $67\frac{1}{2}$ degrees. It has a number of oblong, beveled slots, permitting the insertion of a chisel-pointed pencil for the purpose of drawing horizontal guide lines to facilitate lettering. For lower case lettering, the heights of the capital letters are $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 inch. The lower case letters are two-thirds the height of the capitals. Standard and close spacing between lines is especially provided for. Slots for spacings of $\frac{1}{4}$ and $\frac{5}{8}$ of an inch are located near the base of the triangle, to admit of lines being drawn by means of these slots along the lower edge of a drawing.

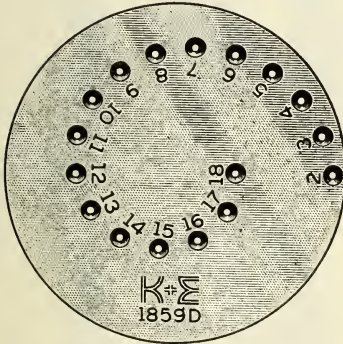


- 1859B-5. Luxylite (transparent) Lettering Triangle, 30°-60°-90°, 5 in.**
- 1859B-8. Luxylite (transparent) Lettering Triangle, 30°-60°-90°, 8 in.**
- 1859C-4. Luxylite (transparent) Lettering Triangle, 45°-45°-90°, 4 in.**
- 1859C-6. Luxylite (transparent) Lettering Triangle, 45°-45°-90°, 6 in.**

Directions furnished with the above triangles.

K & E Lettering Triangles Nos. 1859B and 1859C have a number of groups of counter-sunk holes, which permit the insertion of a sharp pointed pencil for the purpose of drawing horizontal guide lines to facilitate lettering. For lower case lettering the heights of the capital letters are $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$ and 1 inch. The lower case letters are two-thirds the height of the capitals. For lettering consisting entirely of capitals, provision is made for letters .10, .125, .15, .20, .25, .30, .35 and .40 inches in height. The triangular openings are set at an angle of $67\frac{1}{2}^\circ$ for use as slant letter guides.

PARALLEL LINE TRACER



Actual Size.

1859D. Parallel Line Tracer, Xylonite.

There are many useful applications for this instrument, in drawing straight or curved lines at desired distances parallel to the edge of a T-Square, straight-edge, French or other type of curve. With the point of a hard pencil inserted in the hole selected, the Tracer is drawn along the edge of the straight or curved guide. The numbers beside the holes represent their distances in 32nds of an inch from the edge of the guide.

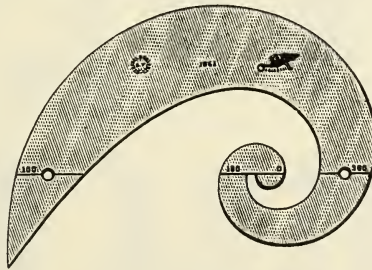
A few of its uses are in graph plotting, to plot empirical curves; in mapping, to outline roads and highways; in railroad work, to draw inner and outer rails from center line, increase or decrease the radius of railroad curves; in airplane or ship design (with splines or ship curves); for cross-hatching; as a lettering guide; in artwork, for designs or borders; in mathematical analysis.

IRREGULAR (FRENCH) CURVES

1860. Xylonite (transparent) Irregular Curves; pattern numbers 1 to 30. In ordering please use catalog number (1860) followed by pattern numbers as illustrated on following page.

LOGARITHMIC SPIRAL CURVE

(Transparent.)



No. 1861.

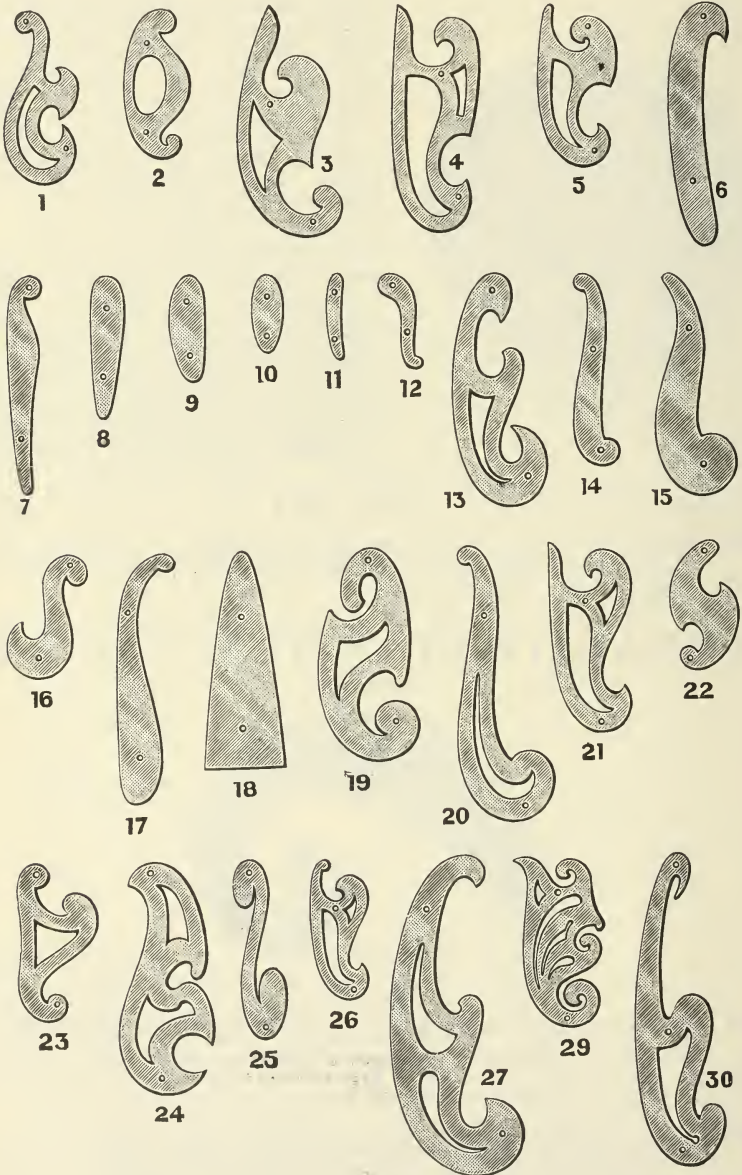
1861. Logarithmic Spiral Curve, Xylonite (transparent), 8 in., with Directions.

This curve is constructed on mathematical principles and contains every curve within the limit of its size. It is a tool of large scope and useful also for various calculations. Full Directions are furnished with it.

Book 117. **The Logarithmic Spiral Curve.** By Wm. Cox. This pamphlet (10 pages) explains the origin of logarithms, describes the method of constructing this curve and illustrates its use by means of several practical examples.

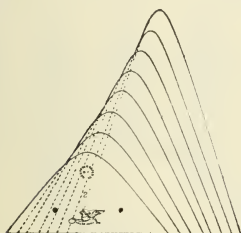
KEUFFEL & ESSER CO., NEW YORK

IRREGULAR (FRENCH) CURVES
(CONTINUED)

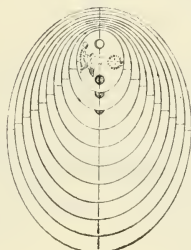


KEUFFEL & ESSER CO., NEW YORK

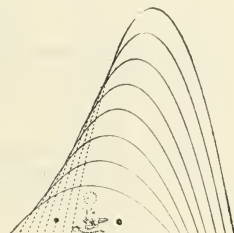
ELLIPSES, HYPERBOLAS, PARABOLAS



No. 1862B.



1862



1862C.

Xylonite (Transparent)

1862. Xylonite Ellipses, set of 10, major axis, $1\frac{1}{2}$ to 6 in. (increasing by $\frac{1}{2}$ in.)

The ratio of the axes of ellipses is 3:4. Both axes are marked.

1862B. Xylonite Hyperbolas, set of 8, base about $3\frac{1}{8}$ in., height 2 to $5\frac{1}{2}$ in. (increasing by $\frac{1}{2}$ in.)

1862C. Xylonite Parabolas, set of 8, base about $3\frac{1}{8}$ in., height $1\frac{1}{4}$ to $5\frac{5}{8}$ in. (increasing by $\frac{5}{8}$ in.)

CURVES FOR MECHANICAL ENGINEERS IN SETS

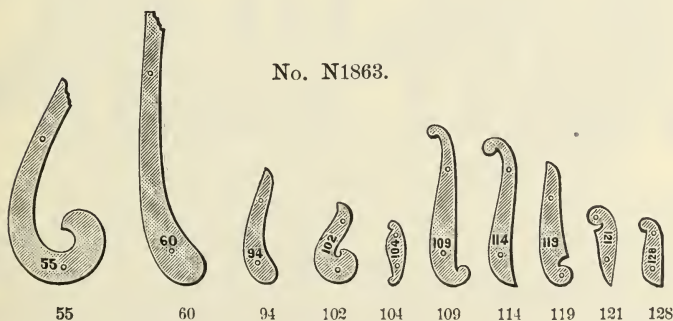


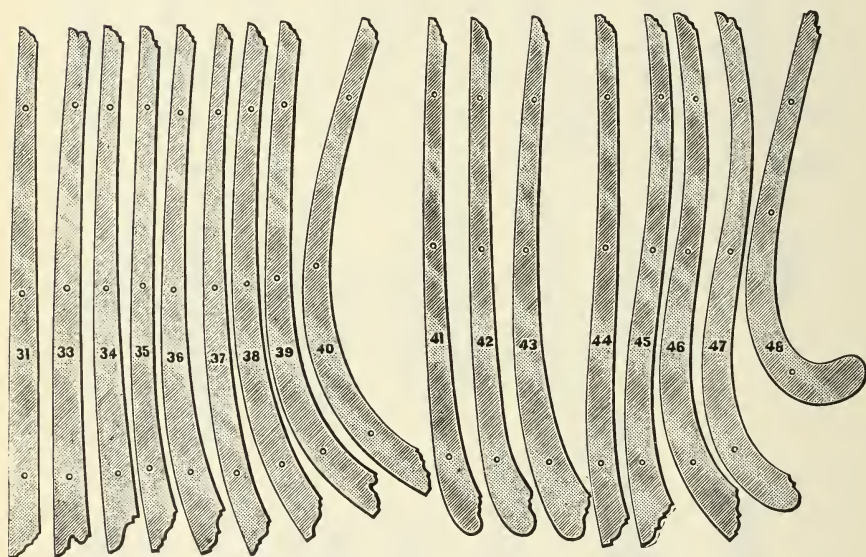
Illustration about $\frac{1}{2}$ size.

N1863. Set of 10 Xylonite Curves (transparent), for **Mechanical Engineers**, containing: Nos. 55, 60, 94, 102, 104, 109, 114, 119, 121, 128 of No. 1864, (page 173); in plain box.

KEUFFEL & ESSER CO., NEW YORK

COPENHAGEN SHIP CURVES

1864. Xylonite (transparent) Copenhagen Ship Curves; pattern numbers 31, 33 to 50 incl., 53 to 60 incl., 62, 64, 68, 71, 80, 83, 84, 86, 89, 91, 92, 94, 95, 97, 100 to 104 incl., 107, 108, 109, 114, 119, 120, 121, 128, 136, and 150. In ordering please use catalog number (1864) followed by pattern number as illustrated below and on page 173.

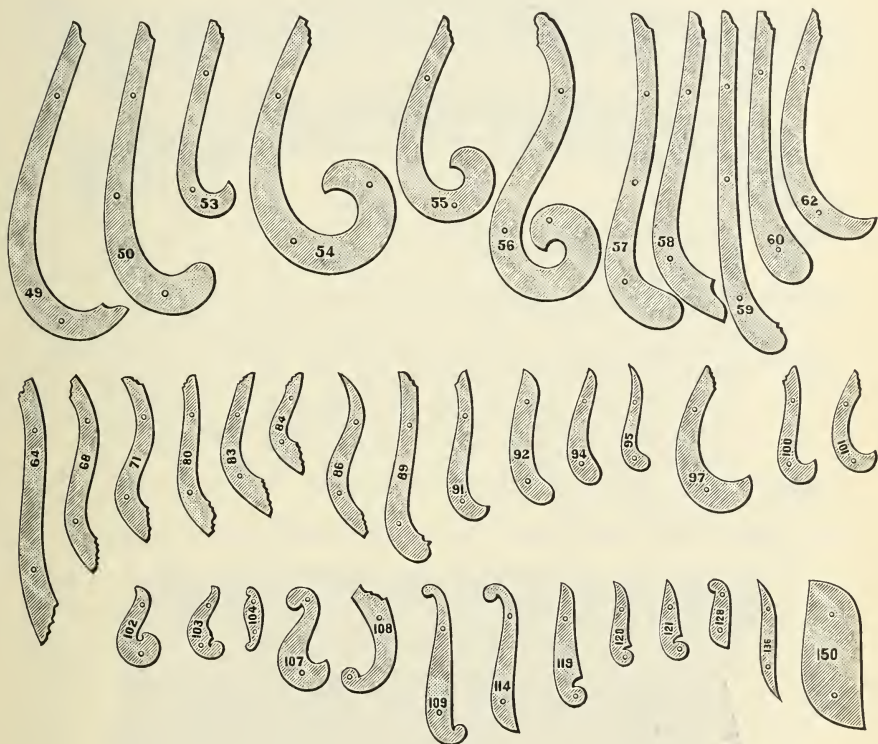


No. 1864. Illustration about $\frac{1}{2}$ size

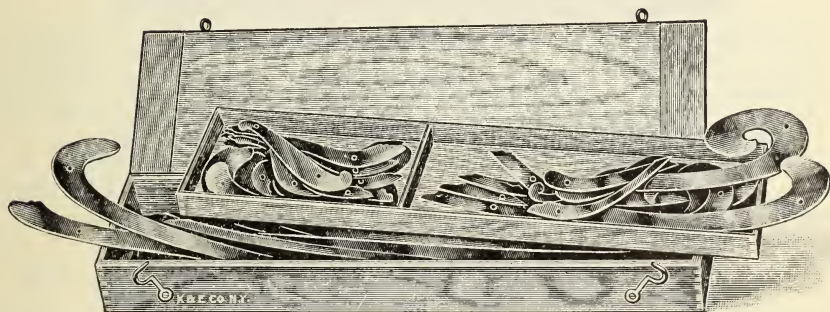


COPENHAGEN SHIP CURVES

(CONTINUED)



No. 1864. Illustration about $\frac{1}{2}$ size.



N1865S. Set of 56 Xylonite (transparent) Copenhagen Ship Curves, Nos. 31 to 150, as listed above under No. 1864; in hardwood Case.

KEUFFEL & ESSER CO., NEW YORK

XYLONITE RAILROAD CURVES

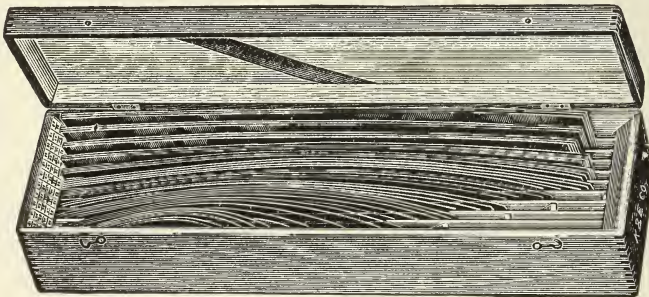
These are true circular curves. They are the same on both edges, so that either edge can be used. Their edges are hand finished.

Sets are put up in wooden boxes, with partitions (except No. 1891) to prevent warping of the curves from mutual pressure while in the box. Each compartment is plainly stamped with the value of the curves contained in it, so that the required curve is easily picked out.

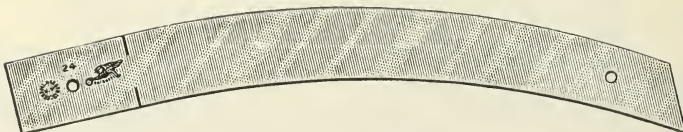


- 1891.** Xylonite (transparent) Railroad Curves, 17 in set, viz: 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60 in. radius; in wooden box.
- 1891A.** Xylonite (transparent) Railroad Curves, 30 in set, viz: $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 35, 40, 45, 50, 60 in. radius; in wooden box **with partitions**.
- 1891B.** Xylonite (transparent) Railroad Curves, 50 in set, viz.: $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, 6, $6\frac{1}{2}$, 7, $7\frac{1}{2}$, 8, $8\frac{1}{2}$, 9, $9\frac{1}{2}$, 10, $10\frac{1}{2}$, 11, $11\frac{1}{2}$, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 110, 120 in. radius; in wooden box **with partitions**.
- 1894A.** Separate (transparent) Xylonite Railroad Curves, from sets 1891, 1891A and 1891B.

Note: Curves without tangents have a radial line at the middle for ease in plotting



No. 1891 C. (Box with partitions)

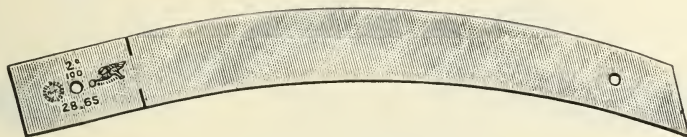


- 1891C.** Xylonite (transparent) Railroad Curves, **with Tangent**, 55 in set, viz. : 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 34, 35, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200 in. radius; in wooden box **with partitions**.
- 1894C.** Separate (transparent) Xylonite Railroad Curves, from set 1891C.

KEUFFEL & ESSER CO., NEW YORK

XYLONITE RAILROAD CURVES

(CONTINUED)



1891 D. Xylonite (transparent) Railroad Curves, with Tangent, marked in degrees and inches, to scale 100 feet = 1 inch, 41 in set, viz.:

0°.30' = 114.59 in.	3°.30' = 16.37 in.	6° = 9.55 in.	8°.30' = 6.75 in.
1° = 57.80 "	3°.45' = 15.28 "	6°.15' = 9.17 "	8°.45' = 6.55 "
1°.15' = 45.84 "	4° = 14.33 "	6°.30' = 8.82 "	9° = 6.37 "
1°.30' = 38.20 "	4°.15' = 13.48 "	6°.45' = 8.49 "	9°.15' = 6.20 "
1°.45' = 32.74 "	4°.30' = 12.73 "	7° = 8.19 "	9°.30' = 6.04 "
2° = 28.65 "	4°.45' = 12.07 "	7°.15' = 7.91 "	9°.45' = 5.88 "
2°.15' = 25.47 "	5° = 11.46 "	7°.30' = 7.64 "	10° = 5.74 "
2°.30' = 22.92 "	5°.15' = 10.92 "	7°.45' = 7.40 "	10°.30' = 5.46 "
2°.45' = 20.84 "	5°.30' = 10.42 "	8° = 7.17 "	11° = 5.22 "
3° = 19.10 "	5°.45' = 9.97 "	8°.15' = 6.95 "	11°.30' = 4.99 "
3°.15' = 17.63 "	in wooden box with partitions.		

1891 E. Xylonite Railroad Curves, with Tangent, marked in degrees and inches, to scale 100 feet = 1 inch, 55 in set, viz.:

0°.15' = 229.18 in.	3°.45' = 15.28 in.	7°.15' = 7.91 in.	11°.30' = 4.99 in.
0°.30' = 114.59 "	4° = 14.33 "	7°.30' = 7.64 "	12° = 4.78 "
0°.45' = 76.39 "	4°.15' = 13.48 "	7°.45' = 7.40 "	12°.30' = 4.59 "
1° = 57.80 "	4°.30' = 12.73 "	8° = 7.17 "	13° = 4.42 "
1°.15' = 45.84 "	4°.45' = 12.07 "	8°.15' = 6.95 "	13°.30' = 4.25 "
1°.30' = 38.20 "	5° = 11.46 "	8°.30' = 6.75 "	14° = 4.10 "
1°.45' = 32.74 "	5°.15' = 10.92 "	8°.45' = 6.55 "	14°.30' = 3.96 "
2° = 28.65 "	5°.30' = 10.42 "	9° = 6.37 "	15° = 3.83 "
2°.15' = 25.47 "	5°.45' = 9.97 "	9°.15' = 6.20 "	16° = 3.59 "
2°.30' = 22.92 "	6° = 9.55 "	9°.30' = 6.04 "	17° = 3.38 "
2°.45' = 20.84 "	6°.15' = 9.17 "	9°.45' = 5.88 "	18° = 3.20 "
3° = 19.10 "	6°.30' = 8.82 "	10° = 5.74 "	19° = 3.03 "
3°.15' = 17.63 "	6°.45' = 8.49 "	10°.30' = 5.45 "	20° = 2.88 "
3°.30' = 16.37 "	7° = 8.19 "	11° = 5.22 "	

in wooden box with partitions. (see cut, page 174).

1894D. Separate (transparent) Xylonite Railroad Curves, from sets 1891D and 1891E.

The above Xylonite Railroad Curves are made to correct radii, to a scale of 1 inch=100 feet, both edges having the same radius. Formula: radius = $\frac{1}{2}$ chord \div sin. $\frac{1}{2}$ angle = $50 \div \sin. \frac{1}{2}$ angle. The short tangents are very useful, as they enable the beginning of the curve to be correctly located on the drawing by means of the radial line separating the tangent from the curve. These curves can also be used for the formula $\frac{1}{2}$ arc \div sin $\frac{1}{2}$ angle, the difference being negligible.

SPECIAL RAILROAD CURVES.

Railroad Curves, as described above,

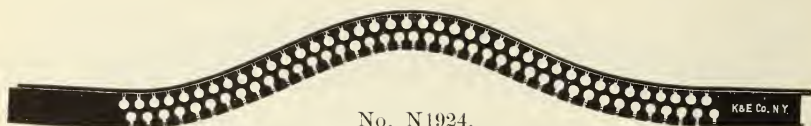
1895. Special (transparent) Xylonite Railroad Curves, without tangent, made to order to any desired radius in inches.

1895T. Special (transparent) Xylonite Railroad Curves, with tangent, made to order to any desired radius in inches.

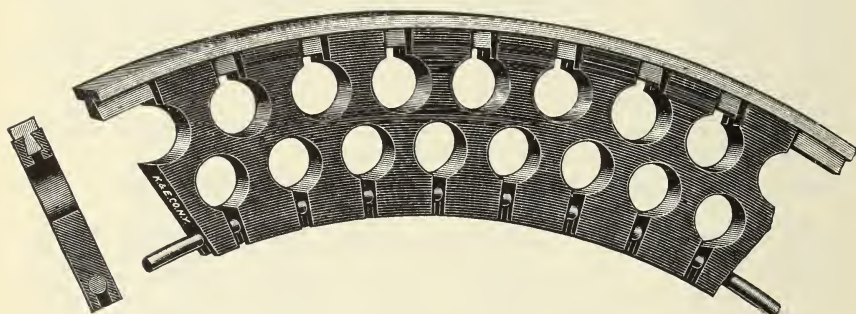
1895S. Special (transparent) Xylonite Railroad Curves, with tangent, marked in degrees and inches, made to order to any desired scale.

KEUFFEL & ESSER CO., NEW YORK

K & E FLEXIBLE CURVE RULE



N1924-12.	K & E Flexible Curve Rule, 12 in. long.
N1924-18.	" " " " " 18 " "
N1924-24.	" " " " " 24 " "
N1924-30.	" " " " " 30 " "



The improved K & E Flexible Curve Rule ideally solves the problem of ruling a smooth curve through any given set of points. It lies flat on the board and is as easy to use as a triangle. Yet it can be bent to fit any contour down to a 2 inch radius and will hold its position without support. The clear xylonite ruling edge stands away from the board just far enough to prevent ink lines from smearing. The curve edge may be set practically up to the line to be drawn, assuring great accuracy either with pencil or pen.

In construction the improved K & E Flexible Curve Rule is strong and durable, and with reasonable care will last a long time. It is not subject to the permanent sets which develop in some types of rule.

ADJUSTABLE CURVES



1925. Adjustable Curve Rule, $14\frac{1}{2}$ in. long, rubber and metal.
 1929. Adjustable Curve Rule, rubber covered, 7 15 31 in.

KEUFFEL & ESSER CO., NEW YORK

SPLINES AND SPLINE WEIGHTS



No. N1934 with 1936 or 1936-1.

N1934.	Splines, (transparent) plastic, grooved,						
	24	30	36	42	48	60	72 in.
1936.	Lead Weights for Splines, with finger, about 4 pounds						
1936-1.	Lead Weights	"	"	"	"	8	"

K & E STEEL STRAIGHTEDGES



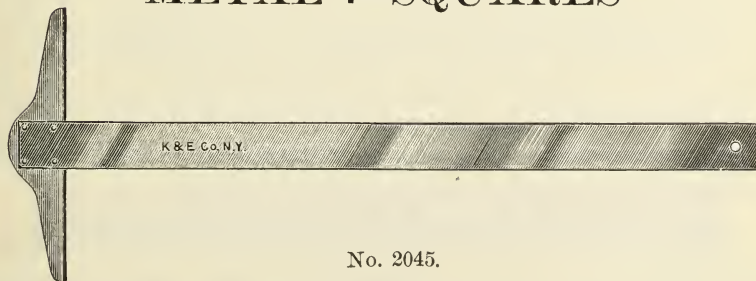
No. 2020



No. 2030.

2020.	Steel Straightedges, with square edges,							
Length	in.	15	18	24	30	36	42	48
Appx. Width	in.	1 $\frac{3}{8}$	1 $\frac{3}{8}$	1 $\frac{3}{8}$	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Appx. Thickness	in.	.07	.07	.07	.09	.09	.09	.09
2030.	Steel Straightedges, one edge beveled,							
Length	in.	15	18	24	30	36	42	48
Appx. Width	in.	1 $\frac{3}{8}$	2	1 $\frac{3}{8}$	2	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$
Appx. Thickness	in.	.07	.07	.07	.09	.09	.09	.09

METAL T-SQUARES

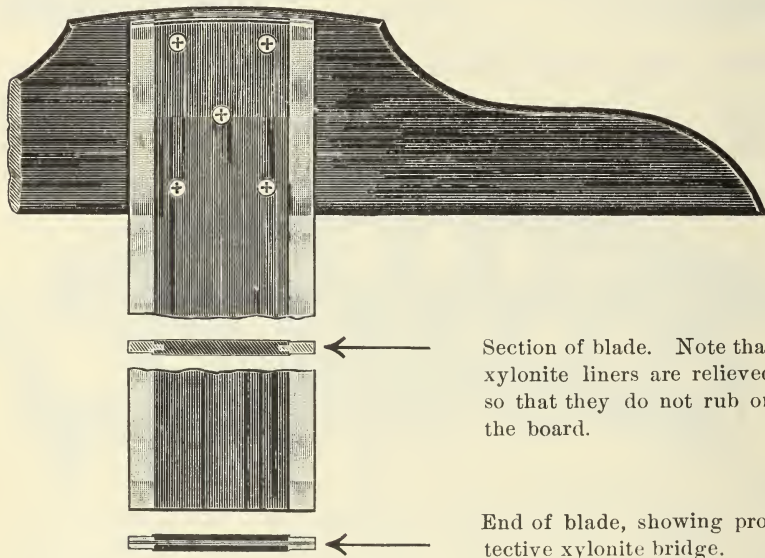


No. 2045.

2045.	T Squares, Steel Blade, fixed metal Head,				
Length	in.	24	30	36	42
Blade 2 in. wide, .09 in. thick.					

KEUFFEL & ESSER CO., NEW YORK

K & E WOODEN T-SQUARES WITH TRANSPARENT XYLONITE LININGS



The new K & E wooden T-squares with xylonite linings are of a construction which offers several advantages to the draftsman.

The surfaces of the xylonite linings have plate-glass smoothness so that they are highly transparent. Moreover, this transparency will not be dimmed by scratching because the linings are assembled with their under surfaces slightly above the bottom of the blade, so that they ride free as the straightedge is slid up and down the board. This arrangement has the further advantage that when drawing with ink, the tip of the ruling pen is not in contact with the straightedge but is below it, so that the ink cannot be drawn to the straightedge by capillary attraction to blot the drawing.

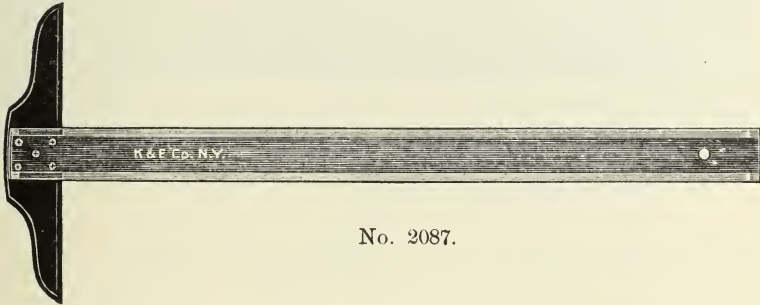
The blade is of mahogany finish maple; the head of ebony finish wood has rounded contours which are agreeable to the hand. Blade and head are firmly joined and all edges are true.



K & E WOODEN T-SQUARES

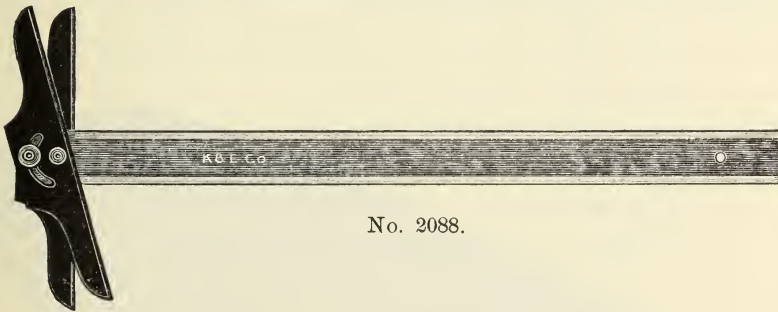
WITH TRANSPARENT XYLONITE LININGS

(CONTINUED)



No. 2087.

- 2087. Wooden T-Square;** blade, mahogany finish maple; lining, transparent xylonite; fixed head, ebony finish.
- | | | | | | | | |
|----|----|----|----|----|----|----|--------|
| 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 in. |
|----|----|----|----|----|----|----|--------|



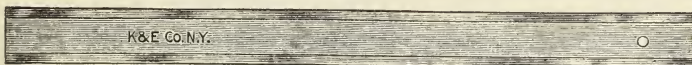
No. 2088.

- 2088. Wooden T-Square;** blade, mahogany finish maple; linings, transparent xylonite; swiveling head, ebony finish.
- | | | | |
|----|----|----|--------|
| 30 | 36 | 42 | 48 in. |
|----|----|----|--------|

WOODEN STRAIGHTEDGE

WITH TRANSPARENT XYLONITE LININGS

The construction of this straightedge is the same as that of the T-square blades described on the previous page.

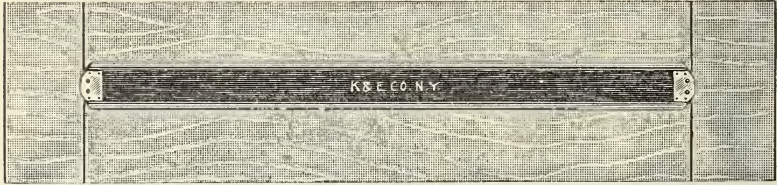


No. 2136.

- 2136. Wooden Straightedge;** maple, with mahogany finish; linings, transparent xylonite.
- | | | | | | | | |
|----|----|----|----|----|----|----|--------|
| 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 in. |
|----|----|----|----|----|----|----|--------|

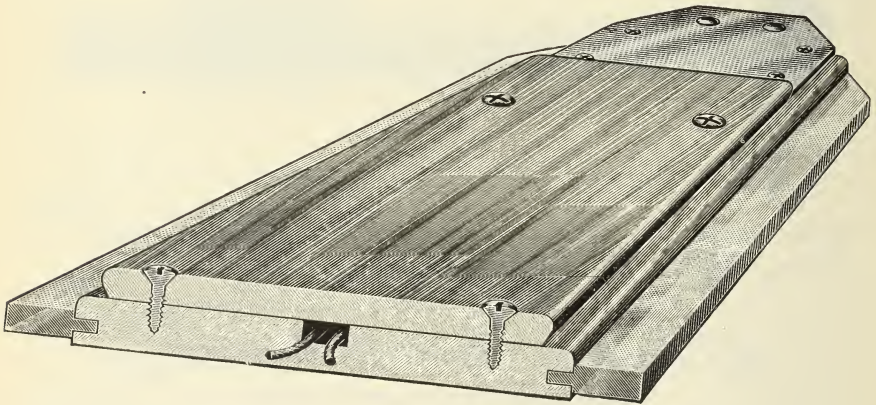
KEUFFEL & ESSER CO., NEW YORK

JACOB'S PARALLEL STRAIGHTEDGE



The parallel straightedge is preferable to the T-Square for all large drawings. While the T-Square serves well for small work, it becomes unwieldy and inaccurate in lengths over four feet. The parallel straightedge, however, has two fundamental advantages over the T-Square:-being supported at both ends it maintains parallel motion automatically; and it may be moved up or down the board with pressure at any point along its length. These features become essential on large drawings or maps.

The Jacob's Parallel Straightedge is a perfected tool of marked superiority both in design and construction. It is available in lengths ranging from 3 to 8 feet.



The straightedge is $3\frac{1}{2}$ in. wide and $\frac{3}{8}$ in. thick. The double maple blade construction has the property of lying flat on the board at all times so that the user is not annoyed by warping or bowing of the blade.

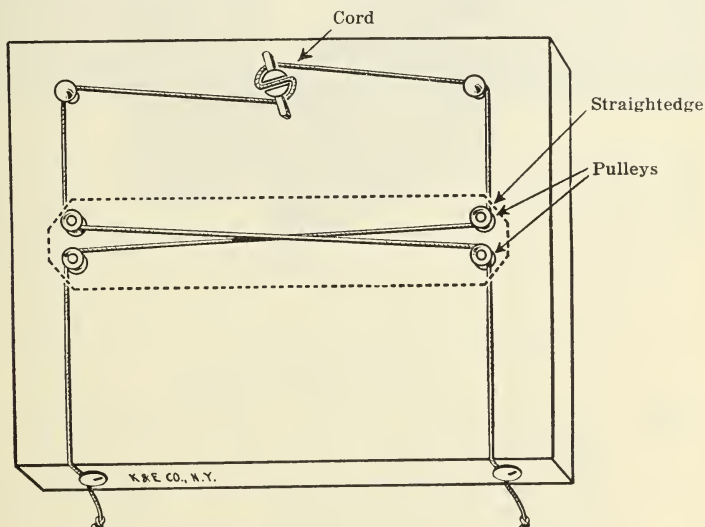
The surfaces of the xylonite linings have plate-glass smoothness so that they are highly transparent. Moreover, this transparency will not be dimmed by scratching because the linings are assembled with their under surfaces slightly above the bottom of the blade, so that they ride free as the straightedge is slid up and down the board. This arrangement has the further advantage that when drawing with ink, the tip of the ruling pen is not in contact with the straightedge but is below it, so that the ink cannot be drawn to the straightedge by capillary attraction to blot the drawing.

KEUFFEL & ESSER CO., NEW YORK

JACOB'S PARALLEL STRAIGHTEDGE

(CONTINUED)

In operation a cord, fastened to the front edge of the board at the left, runs through the blade from left to right, and up around a tack at the upper right to a cord tension adjuster at the upper center. Continuing to the left corner, the cord again goes through the blade, from left to right and is fastened at the lower right corner of the board. When the cord is properly tightened the blade is free to move up or down, but resists any angular motion.



The Jacob's Straightedge is extremely simple to put in service on the board. It is almost as easy to install, as it is to tack on a drawing. It is only necessary to tack or screw the tension adjuster bracket in place, fasten four tacks, train and tighten the cord to put the straightedge in operating condition. The blade angle is quickly adjusted to fit the alignment of the drawing or for angle work by simply loosening the tension adjuster, shifting the angle of the blade as desired and re-tightening.

The complete concealment of cords in the working area of the drawing is greatly appreciated by the draftsman. The high quality and permanent accuracy of the blade, the ease of operation, the simplicity of installing make the Jacob's Straightedge a preferred investment for all large drawing work.

2145. Jacob's Parallel Straightedge; complete with cord, tacks, tension adjuster, and instruction sheet.

Length cord-to-cord; in. 36 42 48 54 60 72 84 96

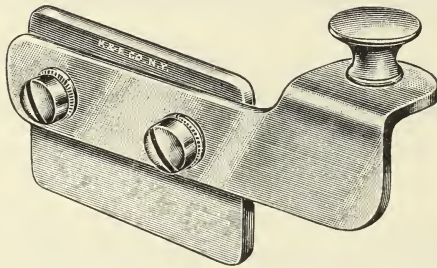
KEUFFEL & ESSER CO., NEW YORK

JACOB'S PARALLEL STRAIGHTEDGE

(CONTINUED)

2145T. Jacob's Parallel Straightedge with ledge for pencils.

Length cord-to-cord 36 42 48 54 60 *72 *84 *96 in.



No. 2145B.

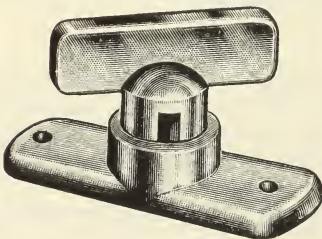
ACCESSORIES

2145B. Cord Spool Bracket for Jacob's Parallel Straightedge, pair (right and left).

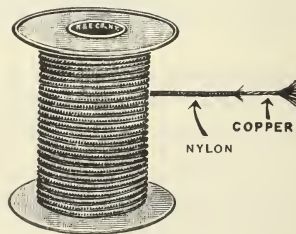
Used only on boards with metal edges and when it is desired to utilize the full width of the board.

2145K. Cord Tension Adjuster for Jacob's Parallel Straightedge.

2146. Cord for Jacob's Parallel Straightedge, nylon covered copper strands, 100 ft. on spool.



No. 2145K.

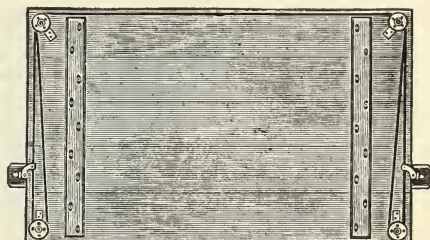
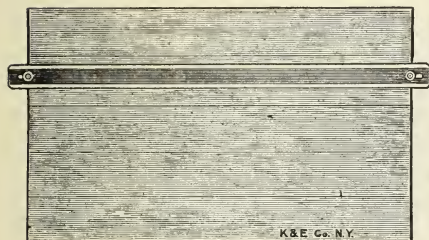


No. 2146.

KEUFFEL & ESSER CO., NEW YORK

K & E PARALLEL ATTACHMENT

FOR DRAWING BOARDS AND TABLES.



The K & E Parallel Attachment insures absolutely parallel motion of the straightedge whether set horizontal or at an angle. The setting is quickly effected by releasing and tightening the clamps which hold the straightedge to the board. In the same way the straightedge can be readily removed when a T square is to be used on the board. The attachment can be applied, without other directions than the above cut conveys, to any board having ledges or available space underneath.

The fixtures consist of 2 double and 2 single pulleys, 2 clamps, and the cord.

- 2147 A. Fixtures for K & E Parallel Attachment (except straight-edge) for boards $\frac{3}{4}$ in. thick.
- 2147 B. " " " " $1\frac{1}{16}$ " "
- 2147 C. " " " " $1\frac{1}{8}$ " "
- 2147 D. " " " " $1\frac{5}{8}$ " "
- 2147 H. " " " " for all Fulton and Hudson
Drawing Tables

When ordering, please state thickness and size of the drawing board.




No. 2149 T.

2149. Maple Straightedge, with xylonite (transparent) linings, for
K & E Parallel Attachment,
for boards 31 42 48 55 60 72 84 96 in.
- 2149T. Maple Straightedge, with xylonite (transparent) linings, for
K & E Parallel Attachment, with ledge for
pencils and small tools,
for boards 31 42 48 55 60 72 84 96 in.

The construction of Nos. 2149 and 2149T is the same as that of the T-square blades described on p. 178.

2146. Special Cord for K & E Parallel Attachment, nylon covered
copper strands, 100 feet on spool.


 KEUFFEL & ESSER CO., NEW YORK

EQUIPMENT FOR PRINTING AND DEVELOPING **PHOTACT** PAPERS REG. U. S. PAT. OFF. AND CLOTHS

PHOTACT contact papers and cloths are coated with a photographic type emulsion. They are far more sensitive to light than blueprint paper. They should not therefore be printed under the powerful lights used for blue-printing. Equipment illuminated with fluorescent or incandescent lights should be used with PHOTACT papers and cloths. In spite of the sensitivity of PHOTACT contact materials, they may be safely handled in dim light and do not require a dark room.

The following pages illustrate Pressure and Vacuum Printers for printing small and medium size sheets of PHOTACT contact papers and cloths, also Vacuum Print Frames for printing sheets of any dimensions up to the largest sizes.

When the Vacuum Print Frame is used for PHOTACT printing, a bank of fluorescent or incandescent lights is substituted for the arc lights. A convenient arrangement is to mount the fluorescent or incandescent lights directly underneath the frame and expose the PHOTACT materials with the frame in the horizontal position.

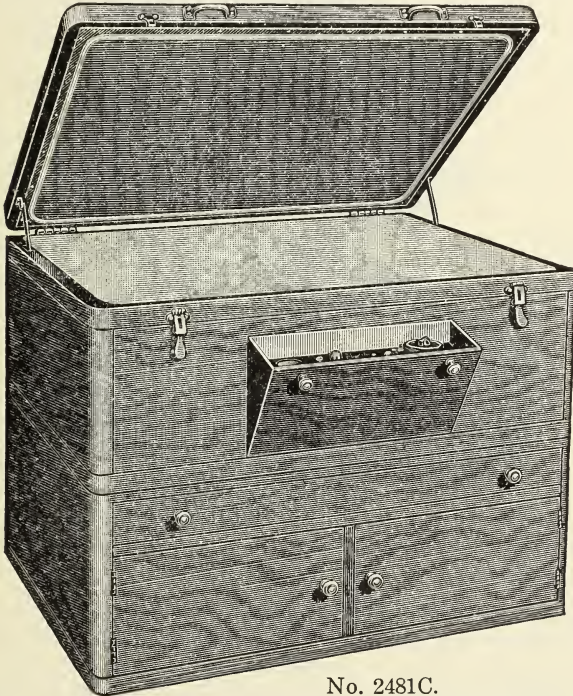
For the continuous printing of rolls or sheets, the 8F Continuous Copier manufactured by The Paragon Revolute Company of Rochester, N. Y. or similar equipment made by The C. F. Pease Company, Chicago, can be recommended. Complete information on these machines can be obtained from the manufacturers.

PHOTACT projection papers and cloths are coated with an emulsion very much more sensitive than that on PHOTACT contact materials. They are usually printed in a camera or other type of projection apparatus from suitable negatives. These materials must be handled in a dark room illuminated only with red safe lights.

For the development, fixing and washing of PHOTACT prints, enamel, wooden or stainless steel trays are generally used. The exact size of the trays and the space needed for the printer, dryers, work table and bleaching board depend on the size of prints to be produced and the volume of work required. If we are given the dimensions of the space available and the volume and type of work to be done, we shall be glad to offer suggestions for a practical layout and information regarding all necessary equipment for the PHOTACT reproduction work.

KEUFFEL & ESSER CO., NEW YORK

EQUIPMENT FOR PRINTING AND
DEVELOPING **PHOTACT** PAPERS
REG. U. S. PAT. OFF.
AND CLOTHS



No. 2481C.

VACUUM PRINTERS

These printers combine in one convenient assembly:- a vacuum print frame with a reinforced counter-balanced hinged top and electrical vacuum pump; a light source with both white and yellow light for direct or reflex printing; convenient timing controls either manual or automatic. The cabinet is walnut finish in two sections, of sturdy construction, and has a drawer for storage of unexposed paper and a compartment for chemicals and supplies.

	PRINTING SURFACE	OVER-ALL SIZE			SHIPPING WEIGHT
		Length	Width	Height	
2481B.	26 in. x 38 in.	44 in.	32 in.	39 in.	350 lbs.
2481C.	30 in. x 40 in.	48 in.	40 in.	39 in.	400 lbs.
2481E.	42 in. x 60 in.	66 in.	48 in.	39 in.	600 lbs.
2481G.	48 in. x 120 in.	126 in.	54 in.	39 in.	1600 lbs.

Other sizes to order.

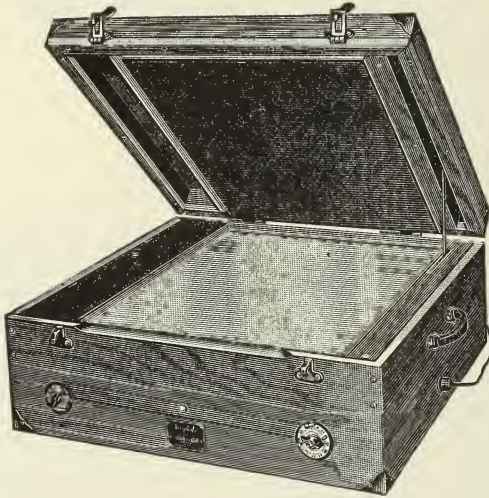
NOTE : The current consumption of this machine is too heavy for the ordinary lighting circuit; a power line must be used. When ordering, state voltage and whether current is AC or DC; if AC, number of cycles per second.

KEUFFEL & ESSER CO., NEW YORK

EQUIPMENT FOR PRINTING AND DEVELOPING **PHOTACT** PAPERS REG. U. S. PAT. OFF. AND CLOTHS

(continued)

No. N2483B.



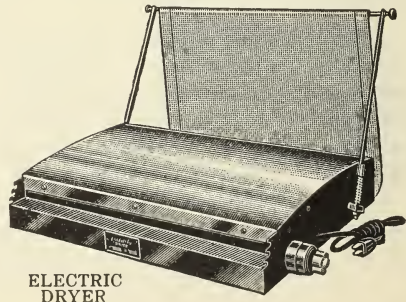
PRESSURE PRINTER

This printer has a counter-balanced lid with a spring pressure pad. It is equipped with white and yellow lights for direct or reflex printing. Manual or automatic timing. Plugs into any light socket and operates from either AC or DC current, 110 volts, or when so ordered, 220 volts. Has storage compartment for two rolls of unexposed paper.

	PRINTING SURFACE	OVER-ALL SIZE			SHIPPING WEIGHT
		Length	Width	Height	
N2483B.	20 in. x 25 in.	29½ in.	27 in.	11½ in.	115 lbs.

PRESSURE PRINTER UNIT

- N2484B. Unit complete, consists of:-
- 1 - N2483B Pressure Printer
 - 1 - Electric Dryer
 - 1 - "Squeegee" Stand
 - 1 - "Squeegee"
 - 3 - White enameled trays,
20 x 24 in.

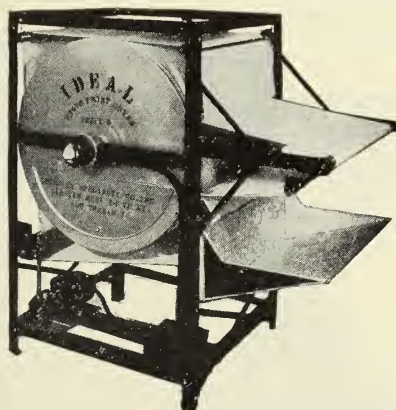


ELECTRIC
DRYER

KEUFFEL & ESSER CO., NEW YORK

IDEAL PRINT DRYER

TRADE MARK



The IDEAL Print Dryer will properly dry any form of reproduction paper, photo prints, blueprints, negative prints, etc. The zipper-laced conveyor belts are driven by an electric motor through a flexible coupling to a positive worm-gear, and are automatically prevented from shifting sideways by a patented control. Drum shaft is mounted on ball bearings. Speed of belts is 2 feet per minute (gas heated models can be furnished to travel 4 feet per minute).

Electrically heated dryers have a 3-heat switch. Gas heated models have a pilot light and combination gas-electric switch, turning the gas off whenever the motor is stopped.

IDEAL Print Dryers are compact; they are 48½ in. high; either 39 in. or 59 in. long; and 47½ in. from back to front, and this dimension may be reduced to 31 in. by dropping the arms in order to get the dryer through a door.

ELECTRICALLY HEATED

2486E-3. 30 in. belt *110V or *220V.

2486E-5. 50 in. belt *220V only.

*State whether DC or AC-60 cycle.

GAS HEATED

2486G-3. 30 in. belt *110V or *220V.

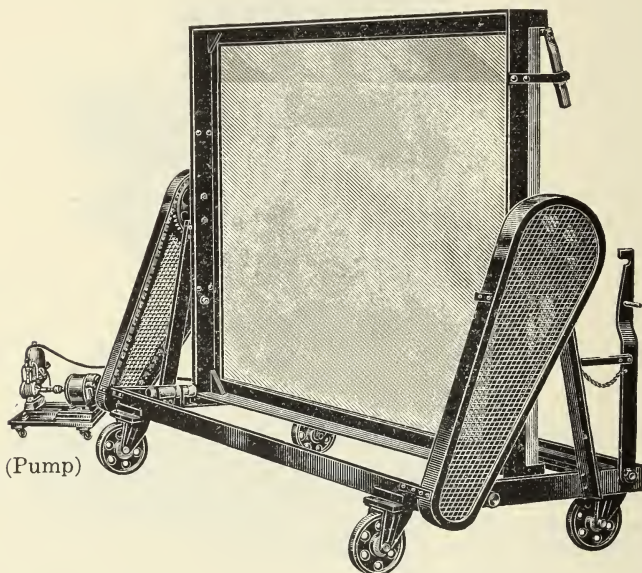
2486G-5. 50 in. belt *220V only.

*State whether DC or AC-60 cycle.

State whether 2 feet or 4 feet per minute.

KEUFFEL & ESSER CO., NEW YORK

K & E VACUUM PRINT FRAME



No. 2496 (Pump)

No. 2490S (Frame)

In the K & E Vacuum Print Frame the two media are held between plate glass and a flexible air tight blanket. As air is exhausted from the small space between glass and blanket by means of a vacuum pump, the atmospheric pressure causes the glass and blanket to press against each other with a force up to 14 lbs. per square inch. This force effectively overcomes minor surface irregularities in the papers or cloths and assures close contact.

The K & E Vacuum Print Frame, is of substantial construction throughout and has all necessary fittings to assure rapid and efficient operation.

- 2490D.** K & E Vacuum Print Frame, effective printing area, 42x62 in., with specially made rubber pad and hose, with plate glass, on iron frame stand.
- 2490F.** Same but 42 x 84 in. (requires two lamps).
- 2490K.** Same but 42 x 120 in. " " "
- 2490S.** Same but 54 x 84 in. " " "
- 2490T.** Same but 54 x 102 in. " " "
- 2490V.** Same but 54 x 120 in. (" two or three lamps).

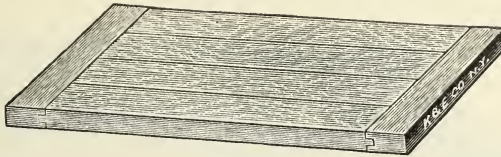
PUMP

2496. Pump for Vacuum Print Frame with $\frac{1}{3}$ H.P. Electric Motor.

When ordering be sure to specify: Voltage - 110 or 220 volts. Current - DC or 60-Cycle AC.



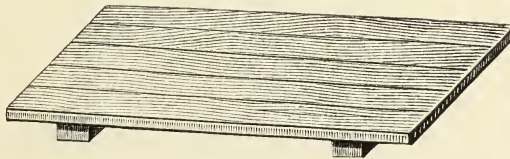
DRAWING BOARDS



No 2505.

Drawing Boards Nos. 2505-2508 have two drawing surfaces. They are of selected white pine or basswood throughout, including the end ledges, finished on both sides and all edges with two coats of clear synthetic varnish. The narrow board strips and the end ledges are tongue and groove construction.

		Thickness	Dimensions
2505.	Drawing Board,	$\frac{3}{4}$ in.	12×17 in,
2506.	“ “	“	16×21 “
2506½.	“ “	“	18×24 “
2507.	“ “	“	20×26 “
2508.	“ “	“	23×31 “



No. N2523.

This drawing board of tongue and groove construction is made of selected white pine, with two back battens. These battens are secured to the board by screws passing through metal washers which are slotted to relieve all warping and splitting strains, due to the swelling or shrinking of the wood.

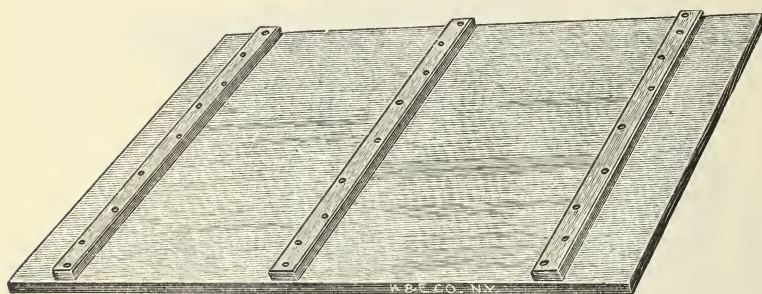
		Thickness	Dimensions
N2522.	Drawing Board,	$\frac{3}{4}$ in.	23×31 in.
N2523.	“ “	“	31×42 “



AMERICAN EAGLE

TRADE MARK

EXTRA LARGE SELECTED DRAWING BOARDS



No. 2538K.

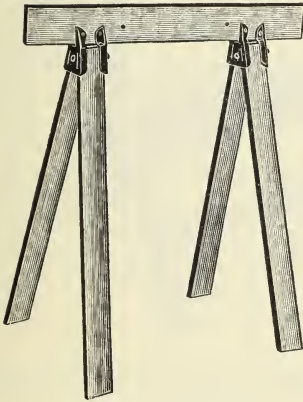
AMERICAN EAGLE Drawing Boards Nos. 2538 A to S inclusive are selected white pine or basswood; they are of tongue and groove construction. Hardwood battens are screwed to the back of the board, which is finished on top and all edges with two coats of clear synthetic varnish. The slotted screw joint between battens and board allows complete freedom for swelling or shrinking without disturbing the assembly, thus relieving all warping and splitting strains. Nos. 2538E to 2538S inclusive have three battens as illustrated; smaller boards have two battens only.

		Appx. Thickness	Dimensions	Shipping Weight About
2538A.	Drawing Board,	$\frac{3}{4}$ in.	31 × 42 in.	25 lbs.
2538BS.	" "	$1\frac{1}{8}$ in.	38 × 48 "	50 "
2538C.	" "	"	38 × 60 "	65 "
2538D.	" "	"	38 × 72 "	80 "
2538E.	" "	"	44 × 72 "	90 "
2538F.	" "	"	44 × 84 "	95 "
2538H.	" "	"	48 × 72 "	120 "
2538I.	" "	"	48 × 84 "	160 "
2538K.	" "	"	48 × 96 "	180 "
2538M.	" "	"	48 × 120 "	215 "
2538R.	" "	"	60 × 96 "	220 "
2538S.	" "	"	60 × 120 "	280 "

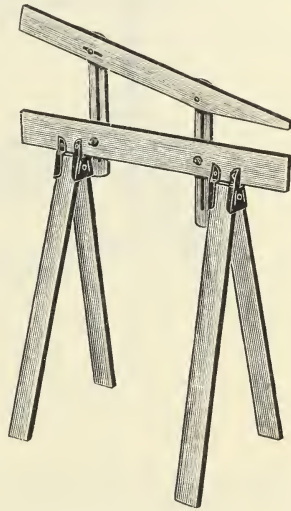
Nos. 2538A to 2538F are packed in corrugated cartons. The remainder are crated.

KEUFFEL & ESSER CO., NEW YORK

WOODEN HORSES AND SLOPES FOR DRAWING BOARDS



No. N2551F.



No. N2551F & G.

N2551F. Pair of Horses, 37 in. high, 35 in. long.

Shipping
Weight
Per Pair
About

23 lbs.

N2551G. Pair of Adjustable Slopes, for N2551F. Increase height to 39 in. and are adjustable to 47 in.; 35 in. long.

10 lbs.

Nos. N2551F and N2551G packed knocked down one pair in a corrugated carton.

KEUFFEL & ESSER CO., NEW YORK

POPULAR DRAWING TABLES

TRADE MARK



No. N2555.

The **POPULAR Drawing Table** is a substantial adjustable table at a moderate price.

The table height may be adjusted to any desired elevation from 33 to 39 in. above the floor.

The tilting device permits the board to be inclined at any desired angle up to 60 degrees with the horizontal in either direction.

The drawing board, of selected white pine or basswood, with pencil ledge, is finished on top and all edges with two coats of clear synthetic varnish, is of tongue and groove construction, and is supported on two hardwood battens. The method of attaching the board to these battens permits expansion and contraction of the board, free from warping or cracking strains.

The base is of hardwood in light oak finish.

		Thickness of Board	Dimensions of Board	Shipping Weight About
N2552.	POPULAR Drawing Table	1 $\frac{1}{8}$ in.	31×42 in.	60 lbs.
N2553.	" " "	"	38×48 "	80 "
N2555.	" " "	"	38×60 "	100 "

UTILITY DRAWER

2559. Utility Drawer, 18×26×3 $\frac{3}{4}$ inches inside, with tool tray, lock and runners with screws, for attaching to the underside of Popular or American Eagle table tops and to drawing boards supported on horses. Shipping weight about 11 lbs.

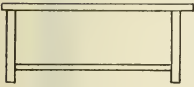
KEUFFEL & ESSER CO., NEW YORK

HUDSON DRAWING TABLES

TRADE MARK

The HUDSON Drawing Table line, consists of numbers, styles and sizes shown below.

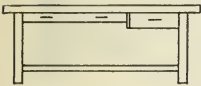
Without Drawers.



(Construction similar to N2568-2, see page 194).

N2568. Adjustable Top 44 x 84 in.
Shipping weight about 180 lbs.

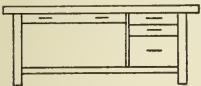
With 1 Tool Drawer and 1 Long Drawer.



(For full description see page 194).

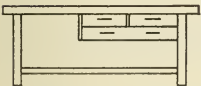
N2565-2. Adjustable Top 38 x 60 in.
N2566-2. “ “ 38 x 72 “
N2567-2. “ “ 44 x 72 “
N2568-2. “ “ 44 x 84 “

With 1 Tool Drawer, 1 Long Drawer and a two-drawer Section.



(For full description see page 195).

N2565-2 with N2569V. Adjustable Top 38 x 60 in.
N2566-2. “ “ “ “ 38 x 72 “
N2567-2. “ “ “ “ 44 x 72 “
N2568-2. “ “ “ “ 44 x 84 “



With 2 Tool Drawers $17\frac{1}{2} \times 25 \times 3\frac{3}{8}$ in. **and 1 Long Drawer**
 $37\frac{1}{2} \times 25 \times 2$ in.

N2568-3. Adjustable Top 44 x 84 in.
Shipping weight about 260 lbs.

Prices include crating for shipment.

Shipped knocked down in corrugated cartons:

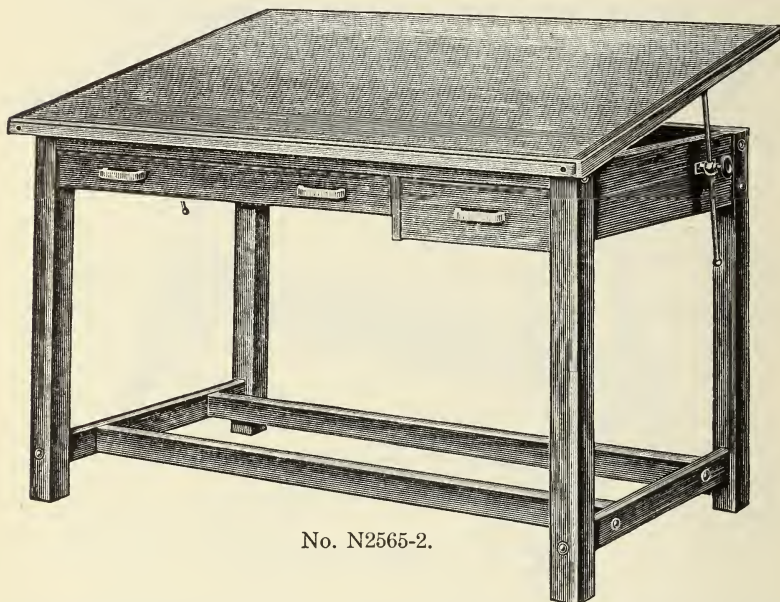
Easily assembled.



HUDSON DRAWING TABLES

TRADE MARK

WITH ONE TOOL DRAWER AND ONE LONG DRAWER



No. N2565-2.

Four post table of sturdy construction with two drawers and adjustable top as illustrated.

The base of the Hudson drawing table is made of selected hardwood with legs braced both ways at top and bottom, bolted construction. Semi-gloss finish.

The board top is 37 in. above the floor. The drawing board, of selected white pine or basswood, $1\frac{1}{8}$ in. thick, of tongue and groove construction, is finished on top and all edges with two coats of clear synthetic varnish. It has cadmium plated steel end cleats and slotted hardwood front rail. An adjusting device permits the board to be tilted to any slope up to 45 degrees. 3 inch dowelled raising blocks, with which the table can be raised to 40 in., can be furnished at an additional charge.

Drawers are dust-protected and easy-sliding. They have semi-gloss finished oak fronts and hardwood sides and back, dovetailed. The tool drawer has a sliding compartmented tray and a barrel lock.

		Shipping Weight About
N2565-2.	Hudson Drawing Table. Adjustable Top $38 \times 60 \times 1\frac{1}{8}$ in. 1 Drawer $10\frac{1}{2} \times 26\frac{1}{4} \times 3\frac{3}{4}$ in. inside. 1 Drawer $36\frac{1}{2} \times 26\frac{1}{4} \times 2$ in. inside.	150 lbs.
N2566-2.	Hudson Drawing Table. Adjustable Top $38 \times 72 \times 1\frac{1}{8}$ in. 1 Drawer $10\frac{1}{2} \times 26\frac{1}{4} \times 3\frac{3}{4}$ in. inside. 1 Drawer $48\frac{1}{2} \times 25 \times 2$ in. inside.	170 lbs.
N2567-2.	Like 2566-2 but with top $44 \times 72 \times 1\frac{1}{8}$ in.	180 lbs.
N2568-2.	Hudson Drawing Table. Adjustable Top $44 \times 84 \times 1\frac{1}{8}$ in. 1 Drawer $10\frac{1}{2} \times 26\frac{1}{4} \times 3\frac{3}{4}$ in. inside. 1 Drawer $55\frac{1}{2} \times 32 \times 2$ in. inside.	200 lbs.

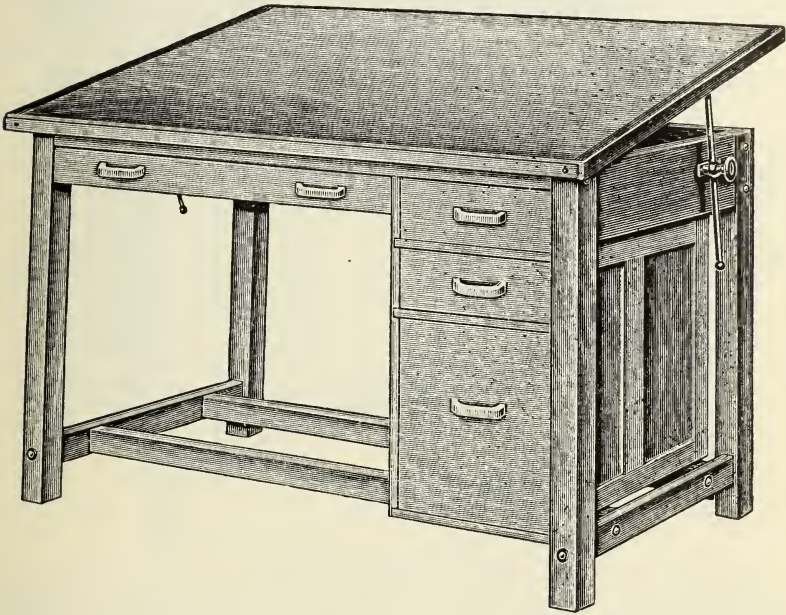
Shipped knocked down in corrugated cartons. Easily assembled.

KEUFFEL & ESSER CO., NEW YORK

HUDSON DRAWING TABLES

TRADE MARK

WITH ONE TOOL DRAWER, ONE LONG DRAWER AND ONE TWO-DRAWER SECTION



No. N2565-2 with N2569V.

These tables are Nos. N2565-2 to N2568-2 (page 194), with the addition of the No. 2569V two-drawer section described below.

								Shipping Weight about
N2565-2	with	N2569V.	Hudson	Drawing	Table.	Adjustable	Top 38×60 in.	220 lbs.
N2566-2	"	"	"	"	"	"	" 38×72 "	240 "
N2567-2	"	"	"	"	"	"	" 44×72 "	250 "
N2568-2	"	"	"	"	"	"	" 44×84 "	270 "

Shipped knocked down, in corrugated cartons. Easily assembled.

HUDSON DRAWER SECTION

N2569V. Hudson Drawer Section, fits Hudson Drawing Tables No. N2565-2 to N2568-2.

1 Drawer 10×25×3 $\frac{3}{4}$ in. inside.

1 Drawer 10×25×13 $\frac{1}{8}$ in. inside.

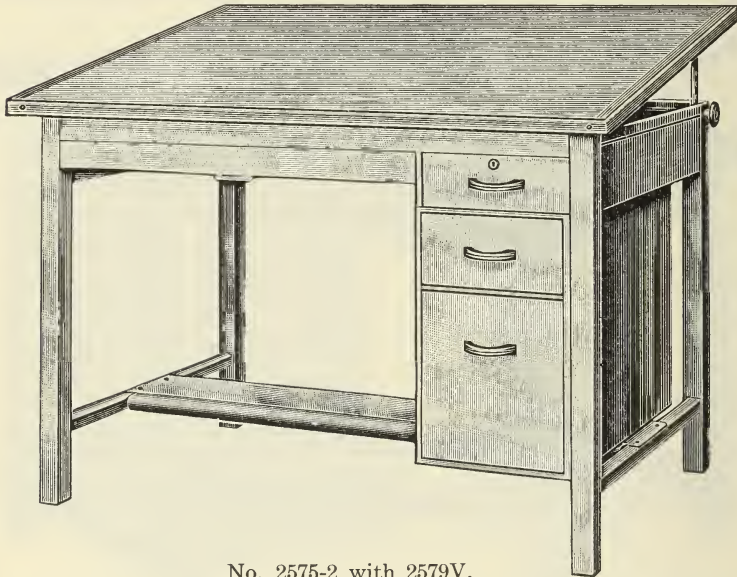
Shipping weight about 70 lbs.

KEUFFEL & ESSER CO., NEW YORK

DREADNAUGHT

TRADE MARK

STEEL BASE DRAWING TABLES



No. 2575-2 with 2579V.

The bases of Dreadnaught Drawing Tables are of heavy gauge, welded steel, braced horizontally and vertically. Drawers are also of steel throughout, dustproof, with smooth easy action. Tool drawers are fitted with a sliding tray. Bases and drawers are durably finished in gray. A strong, wide, comfortable footrest of channeled steel, with aluminum kick plate, extends the length of the base and gives additional rigidity and strength to the table.

Dreadnaught Tables are $37\frac{1}{2}$ inches high and have an extra strong, easily adjusted tilting device. The drawing board, of selected white pine or basswood, $1\frac{1}{16}$ in. thick, of tongue and groove construction, is finished on top and all edges with two coats of clear synthetic varnish. It has cadmium plated steel end cleats and slotted hardwood front rail.

- 2575-2. Dreadnaught Steel Base Drawing Table. Adjustable Top $38 \times 60 \times 1\frac{1}{16}$ in. 1 Drawer $36\frac{1}{2} \times 26 \times 2\frac{1}{4}$ in. inside. 1 Drawer $13 \times 26 \times 4$ in. inside. Shipping weight about 200 lbs.
- 2576-2. Dreadnaught Steel Base Drawing Table. Adjustable Top $38 \times 72 \times 1\frac{1}{16}$ in. Otherwise like 2575-2. Shipping weight about 215 lbs.
- 2577-2S. Dreadnaught Steel Base Drawing Table. Adjustable Top $44 \times 72 \times 1\frac{1}{16}$ in. Otherwise like 2575-2. Shipping weight about 225 lbs.
- 2577-2. Dreadnaught Steel Base Drawing Table. Adjustable Top $44 \times 72 \times 1\frac{1}{16}$ in. 1 Drawer $48\frac{1}{4} \times 30\frac{1}{2} \times 2\frac{1}{4}$ in. inside. 1 Drawer $13 \times 26 \times 4$ in. inside. Shipping weight about 265 lbs.
- 2578-2. Dreadnaught Steel Base Drawing Table. Adjustable Top $44 \times 84 \times 1\frac{1}{16}$ in. Otherwise like 2577-2. Shipping weight about 270 lbs.

DREADNAUGHT STEEL DRAWER SECTION

- 2579V. Dreadnaught Steel Drawer Section. Fits any of the above tables. 1 Drawer $12\frac{3}{8} \times 24 \times 6$ in. inside. 1 Drawer $12\frac{3}{8} \times 24 \times 13\frac{3}{4}$ in. inside. Shipping weight about 55 lbs.

Tables shipped knocked down, in corrugated cartons. Easily assembled.

KEUFFEL & ESSER CO., NEW YORK

DREADNAUGHT

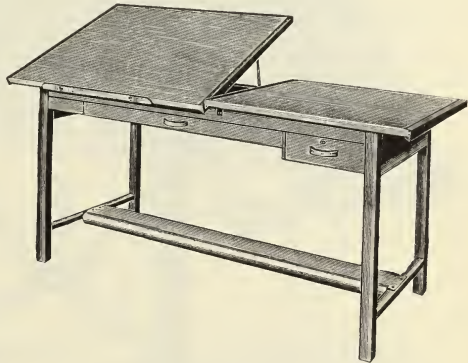
TRADE MARK

STEEL BASE

DRAWING & REFERENCE TABLES

2586-2. Dreadnaught Steel Base Drawing Table, with 38x72x1 $\frac{1}{8}$ in. top divided into adjustable drawing board 38x48 in. and fixed horizontal reference board 38 x 24 in. Shipping Weight about 280 lbs.

2586 $\frac{1}{2}$ -2. Dreadnaught Steel Base Drawing Table, with 38x84x1 $\frac{1}{8}$ in. top divided into adjustable drawing board 38x48 in. and fixed horizontal reference board 38x36 in. Shipping Weight about 290 lbs.



No. 2586-2.

Shipped knocked down in corrugated cartons. Easily assembled.

DREADNAUGHT SECTIONAL STEEL FILING CABINET

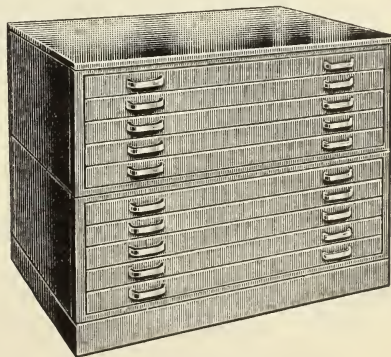
Heavy gauge welded steel, finished in gray, drawers are of steel throughout and run on roller bearings. Each drawer is provided with a removable dustproof cover to protect tracings.

A complete filing cabinet is made up of one top section No. 2579D, one base section No. 2579E and as many drawer sections No. 2579B as desired. A cabinet with two drawer sections is illustrated.

2579B. Dreadnaught Steel Drawer Section, 5 Drawers 43x32 x 2 in. inside. Shipping Weight about 195 lbs.

2579D. Dreadnaught Steel Top Section, for No. 2579B, 46 $\frac{1}{8}$ x36x $\frac{3}{4}$ in. Shipping Weight about 45 lbs.

2579E. Dreadnaught Steel Base Section, for No. 2579B, 46 $\frac{1}{8}$ x36x4 in. Shipping Weight about 30 lbs.

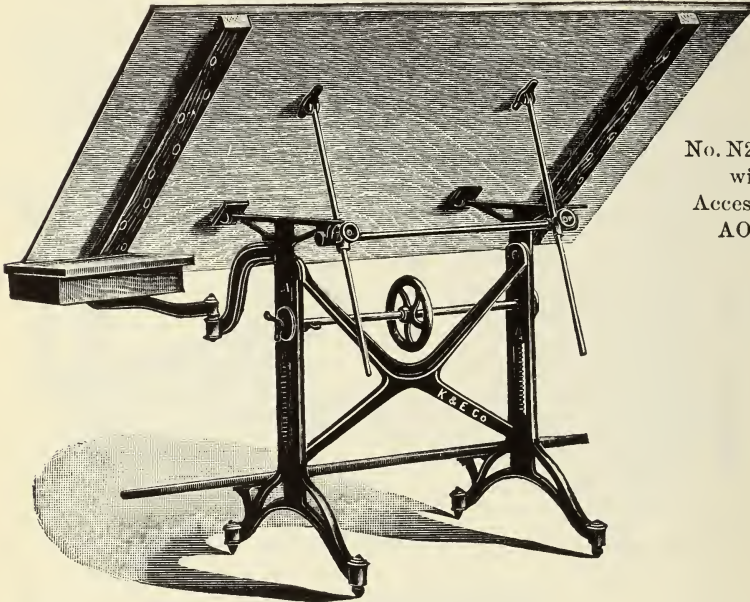


No. 2579D, B, B, E.

KEUFFEL & ESSER CO., NEW YORK

AMERICAN EAGLE DRAWING TABLES

TRADE MARK



No. N2590D
with
Accessory
AO-3.

The **K & E American Eagle** is a very practical drawing table; rigid, substantial, capable of free adjustment, and durable. It is 36 in. high and can be raised to 48 in. by a rack and pinion in each of the two iron standards, operated by one large hand wheel. It can be tilted to any slope from horizontal to nearly vertical, held rigid by rods with clamp screws. The footboard is of hardwood.

The drawing boards, of selected white pine or basswood, of tongue and groove construction, are finished on top and all edges with two coats of clear synthetic varnish. Hardwood battens are screwed to the back of the board. The slotted screw joint between battens and board allows complete freedom for swelling or shrinking without disturbing the assembly, thus relieving all warping and splitting strains. Boards Nos. N2590E to N2590K inclusive have three battens; the smaller boards, two, as illustrated.

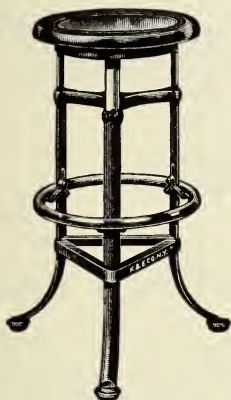
		Board Thickness	Board Dimensions	Shipping Weight About
N2590 A.	Drawing Table,	$\frac{3}{4}$ in.	31×42 in.	180 lbs
N2590BS.	" "	$1\frac{1}{8}$ "	38×48 "	205 "
N2590 C.	" "	" "	38×60 "	220 "
N2590 D.	" "	" "	38×72 "	275 "
N2590 E.	" "	" "	44×72 "	285 "
N2590 F.	" "	" "	44×84 "	290 "
N2590 H.	" "	" "	48×72 "	315 "
N2590 I.	" "	" "	48×84 "	355 "
N2590 K.	" "	" "	48×96 "	410 "

Shipped knocked down. Easily assembled.

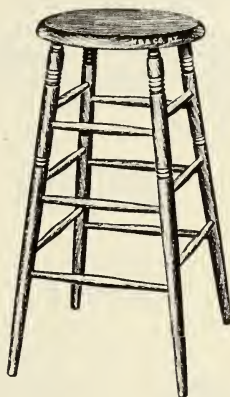
AO-3. Folding Arm with Shelf and one Drawer, $7\frac{1}{2}$ in. long × $14\frac{1}{2}$ in. deep × $3\frac{1}{2}$ in. high inside, with Lock.

KEUFFEL & ESSER CO., NEW YORK

DRAFTSMEN'S STOOLS



No. 2628.



No. 2639.

DREADNAUGHT welded steel drafting stools combine comfort and convenience with exceptional rigidity and strength. Hardwood seats are comfortably shaped. Automatic locks, built into the top brace, permit height adjustment without tools. To lower, raise the seat to full height, thus releasing a catch, which permits the seat to be lowered to the bottom, after which it is raised to the desired level.

		Shipping Weight About
2628.	DREADNAUGHT Draftsman's Stool , diameter 13 in., height adjustment 25 in. to 35 in. Price includes boxing.	19 lbs.
2630.	DREADNAUGHT Draftsman's Stool , diameter 13 in., height adjustment 20 in. to 28 in. Price includes boxing.	17 lbs.
2633.	Back Rest for Nos. 2628 and 2630. Easily attached.	
2637.	Draftsman's Adjustable Stool , diameter, 14 in., height 26 to 30 in., hardwood, light office finish.	30 lbs.
2639.	Draftsman's Stool , diameter, 13 in., height 30 in., hardwood, natural wood finish.	20 lbs.

KEUFFEL & ESSER CO., NEW YORK

DUST COVERS FOR DRAWING TABLES

These Dust Covers are of black cloth with a roller. Brackets are provided to hold the rolled cloth at the back of the table, so as to be entirely off the table top when the table is in use.

2615C.	Dust Cover, on roller, for boards	38 × 60 in.
2615D.	“ “ “ “ “ “	38 × 72 “
2615E.	“ “ “ “ “ “	44 × 72 “
2615F.	“ “ “ “ “ “	44 × 84 “

STAMPED STEEL THUMB TACKS

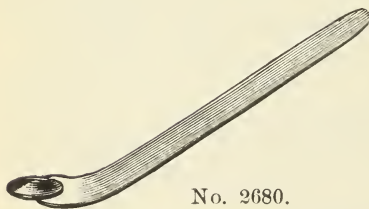


No. 2677-2.

K & E Stamped Steel Tacks are made of one piece of tough, hardened steel. They are finished so that they will not rust easily. They have needle points so that they can be easily inserted and will not make unsightly holes in the drawing board. These tacks can be driven into hardwood without bending or breaking.

2677-2. Plain Steel, $\frac{3}{8}$ in. diam., 100 in a box.

TACK LIFTER



No. 2680.

A handy and simple instrument for extracting thumb tacks. The end of the lifter is inserted under the head of the tack, which it takes out without bending the point or wrenching off the head, as is frequently the case when a knife is used.

The handle of this instrument is a Paperknife, useful for removing drawings which have been glued to the board, etc.

(See also Lead Pencil File and Tack-lifter page 227.)

2680. Tacklifter and Paper Knife, $5\frac{3}{4}$ in. Brass, Nickelplated.

SCOTCH DRAFTING TAPE

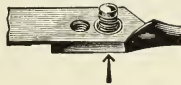
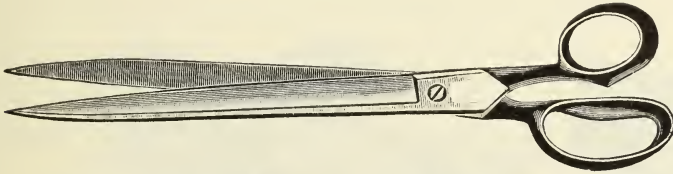
Scotch Drafting Tape, one inch wide, is treated with a special adhesive which requires no moistening. It holds the drawing securely to the board.

2693-1. Scotch Drafting Tape, 1 in. wide, 10 yards in carton

2693-5. “ “ “ “ “ 60 “ “ “

KEUFFEL & ESSER CO., NEW YORK

PAPER SHEARS



Hardened and tempered music-wire spring and self-lubricating steel stud.



Thimble holding the coiled spring and stud.

In these shears, a hollow thimble, containing a music-wire coil spring and a self-lubricating steel stud placed between the blades, insures an automatic upward tension which takes up the wear under the screw thread, thereby automatically keeping both cutting edges in perfect alignment.

2698-14. Paper Shears, Black Handles, 14 in. long.

2698-16. Paper Shears, Black Handles, 16 in. long.

PAPER CUTTER

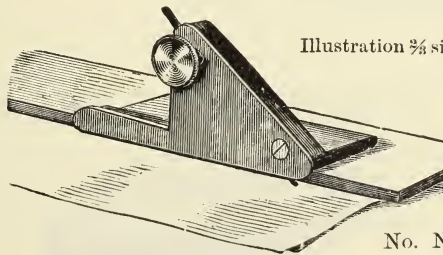


Illustration $\frac{3}{8}$ size.

No. N2701.

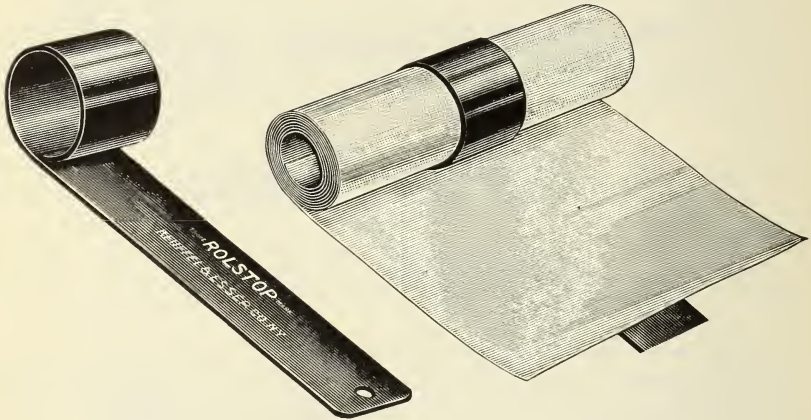
This little instrument is of important service to Draftsmen for cutting drawings from the board as well as for cutting any kind of paper or Bristol board. It is slid along the ruler or T Square and will not injure its edges, as an ordinary knife would do. The blade of this Cutter can be adjusted to cut only the thickness of the paper without striking the drawing board. The knife is set and clamped, and can be removed for sharpening.

N2701. Handy Paper Cutter.



ROLSTOP

TRADE MARK

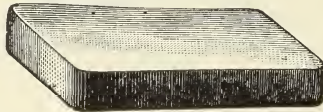


No. 2703.

This is a simple device which keeps blue prints or tracings from rolling or unrolling while they are being examined, checked or altered. It is superior to weights, tacks or clips, since it admits of bringing any portion of the drawing into view by a simple movement in practically the same way as if the sheet was mounted upon a roller. A pair of these devices form a handy means of holding a rolled sheet for ready reference and in the smallest possible space.

2703. Rolstop, blue plastic, two in box.

PAPERWEIGHTS



No. 2710.

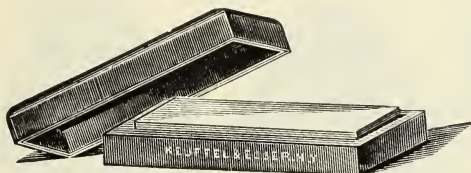
2705. Paperweight. Shot in lined chamois bag impervious to lead dust; a very practical paperweight, about 2 pounds.

2710. Lead Paperweight, covered with leather, about $4 \times 2\frac{1}{4} \times \frac{3}{4}$ in., about $2\frac{3}{4}$ pounds.

KEUFFEL & ESSER CO., NEW YORK

ARKANSAS OIL STONES

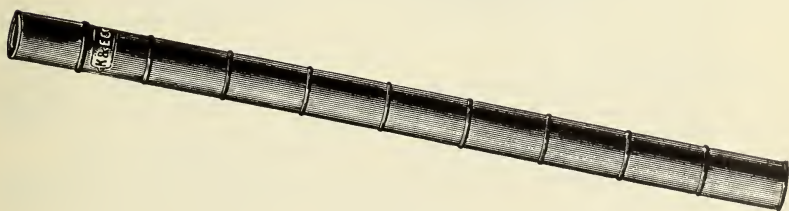
No. 2720.



2720. Arkansas Oil Stone, hard, in polished wood case with cover,
about $3\frac{1}{2} \times \frac{7}{8}$ in.

2730N. Arkansas Oil Stone, knife blade, about $3\frac{1}{2} \times \frac{3}{4} \times \frac{1}{4}$ in.

METAL STORAGE TUBES



No. 2732.

These all metal tubes are recommended for the storage of sensitized papers and cloths; also for the preservation of tracings, maps, etc. Close fitting pull-off type covers assure light-proof and dust-proof security for stored materials.

Storage Tubes:

2732. for 10 yard rolls, 30, 36, or 42 in. wide.

2732X. for 50 yard rolls, " " " " " "

KEUFFEL & ESSER CO., NEW YORK

KECO

REG. U. S. PAT. OFF.

WATERPROOF DRAWING INK



KECO Black Waterproof Drawing Ink produces dense black lines which are entirely opaque against light, even when drawn on tracing cloth. Hence, reproductions from originals drawn with KECO ink have sharp, clean lines. When used to cover large areas, KECO will not crack or spall.

KECO Colored Waterproof Drawing Inks are the most light-fast, brilliant drawing inks ever offered to draftsmen and artists. Since they can be blended, any desired color or tint may be produced. Washes run over them, after they are dry, will not smear them.

KECO White Waterproof Drawing Ink is an extremely opaque snow-white pigment ink. It is excellent for line work with any type of pen, also for wash drawings with brush or air brush. It blends perfectly with KECO black or colored inks.

KECO $\frac{3}{4}$ ounce bottles are furnished with a patented rubber-top filler, with non-shatterable tube.

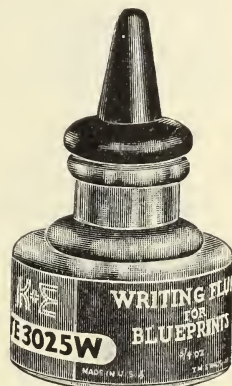
		$\frac{3}{4}$ OZ.	$\frac{1}{2}$ PT.	PINT	QUART
KECO INK	Black,	3000	3000D	3000E	3000F
" "	Brown,	3001	3001D	3001E	3001F
" "	Blue,	3002	3002D	3002E	3002F
" "	Green,	3003	3003D	3003E	3003F
" "	Scarlet,	3004	3004D	3004E	3004F
" "	Carmine,	3005	3005D	3005E	3005F
" "	Yellow,	3006	3006D	3006E	3006F
" "	Orange,	3008	3008D	3008E	3008F
" "	Violet,	3009	3009D	3009E	3009F
" "	White,	3011	3011D		

KEUFFEL & ESSER CO., NEW YORK

LIQUID COLORS AND WRITING FLUIDS



No. 3022.



No. 3025W.

"NO-RINKLE" LIQUID COLORS

TRADE MARK

NO-RINKLE Black and Colors may be applied with a brush or spray to large areas on tracing cloth, tracing paper and drawing paper, without producing any wrinkles whatsoever, thus insuring perfect contact in photo printing. They are also excellent for making permanent inscriptions or washes on glossy photographs, under conditions in which drawing ink cannot be successfully used on account of its tendency to chip off, or to spread unevenly and wrinkle when applied in large areas.

NO-RINKLE Black is particularly recommended for blocking out sections of negatives; while the colors, since they spread evenly, are ideal for filling in areas on maps, charts, drawings, graphs, etc.

NO-RINKLE Liquid Colors can be used in the same manner as water-colors; their brilliant hues making them particularly desirable for that type of work. Only **NO-RINKLE Thinner** should be employed for diluting or blending these colors

3021. NO-RINKLE Black. A permanent black liquid; $\frac{3}{4}$ oz. bottle.

3021E. " " " " " " " 1 pt. "

3021F. " " " " " " " 1 qt. "

3022. NO-RINKLE Liquid Colors, Brown, Blue, Green, Scarlet, Carmine, Yellow, Orange, Violet; $\frac{3}{4}$ oz. bottle.

3023. NO-RINKLE Thinner, for diluting and blending **NO-RINKLE Liquid Colors;** $\frac{3}{4}$ oz. bottle.

WRITING FLUIDS

FOR MAKING ALTERATIONS AND ADDITIONS ON PRINTS.

3025M. Writing Fluid, for Brownprints, white, $\frac{3}{4}$ oz. bottle.

3025W. Writing Fluid, for Blueprints, white, $\frac{3}{4}$ oz. bottle.

3025R. " " " " red " "

3025Y. " " " " yellow " "

KEUFFEL & ESSER CO., NEW YORK

ERASING FLUIDS

- 3027.** Inkoff, for removing ink lines and colored pencil from non-moisture-proof tracing cloth; 1 oz. bottle.
- 3028.** Erasing Fluid. Set of two $\frac{3}{4}$ oz. bottles for use on MADURO, DUPRO and PHOTACT reproduction papers and cloths. With directions.
- 3028-1E.** Erasing Fluid. No. 1 Solution of No. 3028, 1 pint bottle.
- 3028-2E.** “ “ “ 2 “ “ “ “ “ “ “
- 3030.** Erasing Fluid for HELIOS Black, Blue and Maroon Line Prints (Nos. 470, 471, 480, 481, 482, 515 and 516). Set of three 1 oz. bottles.
- N3031.** Erasing Fluid for HELIOS Sepia Line Prints (Nos. N493, 497, 498, 510 and 511). Set of two 1 oz. bottles.
- 3033.** Erasing Fluid for HELIOS Sepia Line Prints (Nos. N493 and 518 only), 1 oz. bottle.

DRAFT-CLEAN POWDER



No. N3036.

The powder, sprinkled lightly over the drawing surface at the start of work, protects drawings from graphite smears and dirt and keeps drafting tools clean. The powder is free from grit and abrasives.

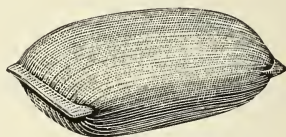
Instructions are printed on the container.

N3036. DRAFT-CLEAN POWDER, in shaker top container, (approximately 2 oz.).

N3036-2. DRAFT-CLEAN POWDER, 2 lbs., in container with pouring spout.

ABC
TRADE MARK

DRY-CLEAN PAD



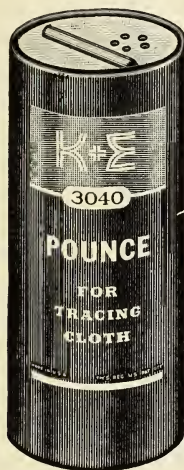
No. 3037.

Tiny gum eraser particles inside the pad, sifting through its mesh, absorb dirt. These particles will not dry out or harden. They contain no grit or abrasive to harm the drawing surface. They will not affect its ink-line taking qualities.

3037. ABC DRY-CLEAN PAD for cleaning and protecting drawing surfaces.

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POUNCE



No. 3040.

TRANSLUX

TRADE MARK



N3042E.

3040. Pounce, for tracing cloth, in shaker top container.

Before inking on tracing cloth, the surface should be prepared with Pounce. A small amount of powder is dusted on, rubbed evenly with a soft cloth, and the excess thoroughly removed.

N3042D. TRANSLUX in Bottle, $\frac{1}{2}$ pint.

- | | | | | |
|----|---|---|---|-----------|
| E. | " | " | " | 1 pint. |
| F. | " | " | " | 1 quart. |
| G. | " | " | " | 1 gallon. |

TRANSLUX is a transparentizing agent for paper. It is especially useful in obtaining good contact reproductions from paper tracings which have become opaque with age. Brownprint negatives on opaque paper or even drawings on thin drawing paper may be made suitable for contact reproductions. **Translux** is applied by spreading it evenly over the back surface with a soft cloth. It dries quickly; the transparentizing effect is permanent; it has no injurious effects on the paper.

3048. Ink-bottle Holder and Paperweight, iron, enameled, weight about 2 lbs.

The bottle is inserted from below and secured by a bayonet flange. It will hold any of the $\frac{3}{4}$ oz. drawing ink bottles generally used.

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WASH BRUSHES

Illustration full Size.

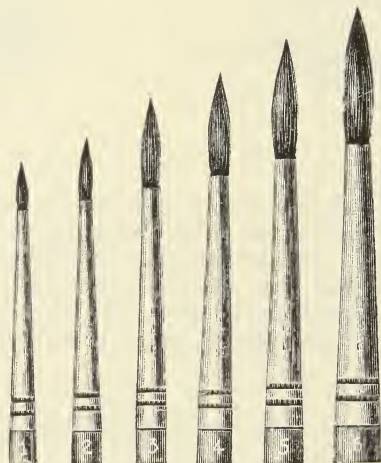


No. D3121

D3121. Red Sable, round, black Handle.

Nos. 1 2 3 4 5 6 7

The above are real sable brushes, and contain no adulterant of any kind.
Real sable brushes form a fine point.



No. D3132

D3132. Camel Hair, black Handle.

Nos. 1 2 3 4 5 6



ART AND DRAFTING PENS

ESTERBROOK



3208-62.



3208-64.

CROW QUILL PENS

- 3208-62. Crow Quill or Lithographic "superlatively flexible" pen, bronze finish.
- 3208-62B. Same, 12 pens and 1 penholder in box.
- 3208-64. Long Shoulder Crow Quill "extra fine" pen, bronze finish.
- 3208-64B. Same, 12 pens and 1 penholder in box.



3208-302.

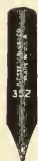
- 3208-302. Card of Assorted Pens, one each Nos. 3208-62, -355, -356, -357, -358, No. 0 Lettering Pen, crow quill pen holder, and fine pen holder.

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ART AND DRAFTING PENS - ESTERBROOK

(CONTINUED)

FINE LINE (Lettering) PENS



3208-352



3208-354



3208-355



3208-356



3208-357



3208-358

- 3208-352. Very small "super fine, super-flexible" pen, bronze finish.
 3208-352C. Same, 12 pens and 1 penholder on card.
 3208-354. Small "super fine, super-flexible" pen, blue finish.
 3208-354C. Same, 12 pens and 1 penholder on card.
 3208-355. Small fine writing "flexible" pen, blue finish.
 3208-355C. Same, 12 pens and 1 penholder on card.
 3208-356. Extremely fine small "extra flexible" pen, bronze finish.
 3208-357. Medium size "extra fine" pen, "super-flexible" bronze finish.
 3208-358. Medium size "extra fine" pen, "extra flexible" bronze finish.

PENHOLDERS.



No. D3220.

D3220. Crow Quill Penholder.



No. D3221.

D3221. Lettering Penholder.

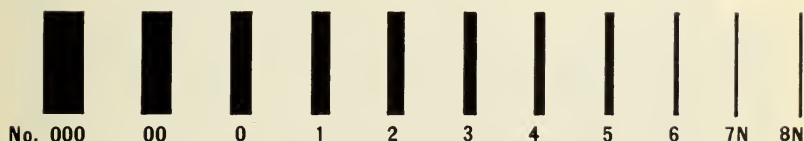


BARCH-PAYZANT (FREEHAND) LETTERING PENS



Cork Grip furnished with Nos. 7N and 8N.

11 Widths of Lines



Barch-Payzant Lettering Pens are useful for freehand lettering on mechanical and architectural drawings. They are also widely employed in the commercial field for making up price tags, show cards, etc.

These pens are designed to produce the same gauge of lines regardless of the direction in which the pen is moved in lettering. Hence, letters of any desired width can be formed with a single stroke of a Barch-Payzant pen. An ink reservoir of generous size makes frequent re-filling unnecessary.

BRASS.

3224. Barch-Payzant Lettering Pens, Brass, Nos. 0, 00, 000.

3224. “ “ “ Nos. 1, 2, 3, 4, 5, 6.

BRASS, CHROMIUM PLATED.

3224-7N. Minute Barch-Payzant Lettering Pen, Brass, Chromium Plated.

3224-8N. “ “ “ “ “

SETS.

N3225. Set of six pens, Nos. 1, 3, 5, 6 (Brass), 7N, 8N, (Brass, chromium plated), in cardboard box.

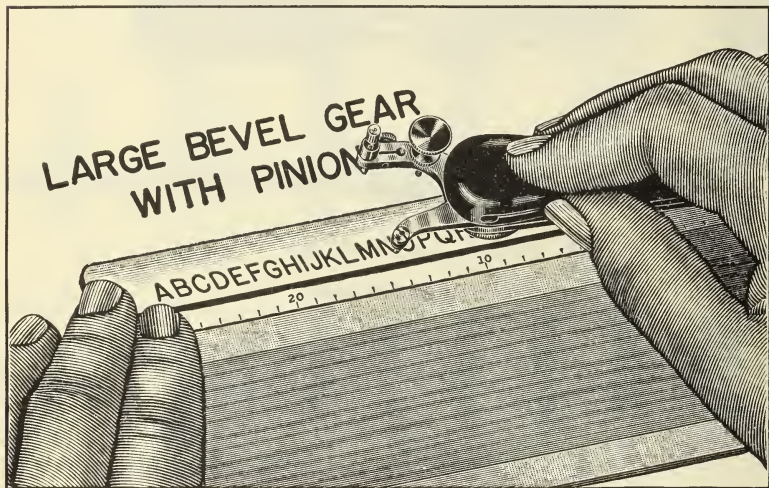
3226. Morocco Finish Case to hold assortment of any 6 pens.

NOTE: Set of any six pens Nos. 1 to 8N furnished in cardboard box.
For total price, add prices of pens desired.

KEUFFEL & ESSER CO., NEW YORK

LEROY LETTERING

REG. U. S. PAT. OFF.



Lettering which has the regularity of printed type is easily and quickly produced with the aid of Leroy lettering equipment.

The precision of Leroy lettering adds distinction to drawings or maps. The ease with which it can be applied removes a tedious detail from drafting routine.

The units used in Leroy lettering are a scribe fitted with one of several sizes of Leroy pens, and a template carrying depressed characters.

In operation, as the tracer point of the scribe follows the outline of a letter in the template, the Leroy pen in plain view above, reproduces the letter on the drawing.

Since all parts of Leroy lettering equipment are made of the finest materials, machined with the greatest precision, they not only operate with surprising ease and smoothness, but produce letters that are uniform in every respect.

The various Leroy units may be purchased separately or in complete sets as listed on the following pages.



LEROY LETTERING

REG. U. S. PAT. OFF.

(CONTINUED)

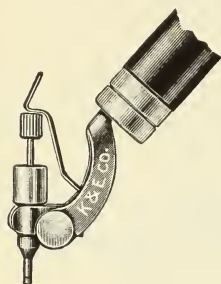
TEMPLATE NO.	00	0	1	2	PEN 3	NO. 4	5	6	7N	8N
80	A *	B	C							
100	A *	B	C	D						
120	A	B *	C	D	E					
140	A	B	C *	D	E	F				
175	A	B	C	D *	E	F	G			
200	A	B	C	D	E *	F	G	H		
240	A	B	C	D	E *	F	G	H		
290	A	B	C	D	E	F *	G	H	K	
350	A	B	C	D	E	F *	G	H	K	L
425	A	B	C	D	E	F	G *	H	K	L
500	A	B	C	D	E	F	G	H *	K	L

Sample of Leroy lettering showing the wide range of lettering styles available by combining various Leroy templates and pens. Standard combinations of template and pen are marked with an asterisk *

KEUFFEL & ESSER CO., NEW YORK

LEROY LETTERING PENS

REG. U. S. PAT. OFF.



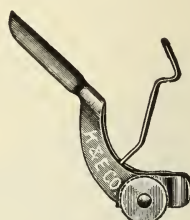
Pen, Socket Holder and Penholder complete for freehand lettering



Pen Complete



Cleaning Pin

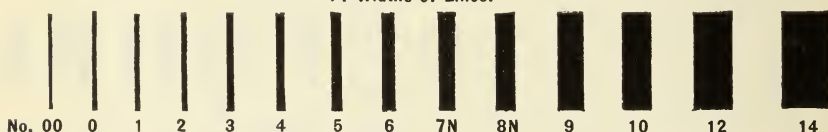


Socket Holder for freehand lettering

Made with watch-like precision, LEROY pens are probably the most efficient lettering pens ever produced. Smooth flowing ink lines of definite thickness are formed in any direction of travel, without clogging, or blotting. They require no adjustment, do not easily get out of order; with reasonable care they will last indefinitely.

LEROY pens are ideal for hand lettering, and may be fitted to an ordinary pen holder by means of the special socket No. 3234-1.

14 Widths of Lines.

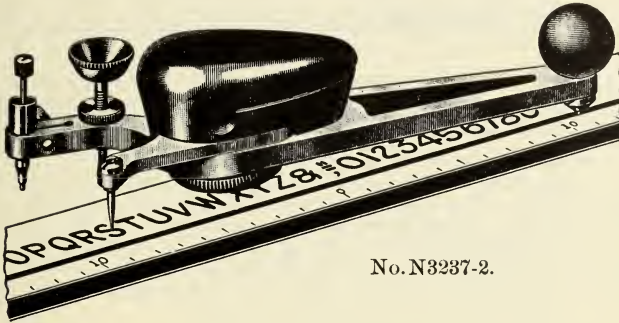


- 3231. LEROY Pen Set, containing 8 pens Nos. 3233-1 to -8N; inclusive; and 2 socket holders No. 3234-1; in morocco finish case.
- 3233-00 to 3233-14. LEROY Lettering Pens complete; specify size -00 to -14, by line thickness as shown in above diagram.
- 3233-00C to 3233-14C. Cleaning Pins, for LEROY Lettering Pens 3233-00 to -14; specify by pen size.
- 3233-20. Cleaning Fluid for LEROY Pens, 1 oz. in bottle.
- 3233-20F. Cleaning Fluid for LEROY Pens, 1 quart.
- 3234-1. Socket Holder for LEROY Pens Nos. 3233-00 to -8N.
- 3234-2. Socket Holder for LEROY Pens Nos. 3233-9 to -14.
- 3235. Penholder.

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LEROY SCRIBERS

REG. U. S. PAT. OFF



No. N3237-2.

LEROY Scribers are of two types; the Adjustable Scriber, which produces both vertical and slanting letters (any slant desired, up to $22\frac{1}{2}$ degrees) from a single template, and the Fixed Scriber that produces vertical letters only.

The Scriber holds the pen in exact alignment and controls its motion as the tracer pin glides through the character grooves of the template to produce characters of uniform accuracy.

- N3237-1.** Fixed Scriber, for use with LEROY Pens up to No. 3233-8N; and with LEROY Templates, sizes 80 to 500 (vertical only).
- N3237-2.** Adjustable Scriber, for use with LEROY Pens up to No. 3233-8N; and with LEROY Templates sizes 80 to 500 (vertical or slanting) and sizes 700 to 2000 (vertical only).
- N3237-3.** Fixed Scriber, for use with LEROY Pens No. 3233-9 to -14 and, with Adapter, for use with Pens Nos. 3233-00 to -8N; and with LEROY Templates, sizes 700 to 2000 (vertical only).
- N3238-1.** Lead Holder to fit LEROY Scribers Nos. N3237-1 and -2 for pencil lettering.
- 3238-3.** Tracer Pin to fit LEROY Scribers Nos. N3237-1 and N3237-2 (in place of regular tracer pin) for use with LEROY Templates Nos. 3240-60C and 3240-80CL.
- N3238-5.** Thin Line Stylus to fit LEROY Scribers Nos. N3237-1 and -2 for lettering on duplicating stencils.
- N3238-6.** Heavy Line Stylus to fit LEROY Scribers Nos. N3237-1 and -2 for lettering on duplicating stencils.
- 3238-10.** Scriber Stand, holds Scriber when not in actual use and keeps point of LEROY Pen clear of drawing table.
- 3239P.** Straightedge, plain, Luxylite, 15 in. long, $1\frac{3}{8}$ in. wide, non-puncturing device holds straightedge stationary on the drawing.

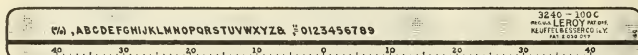
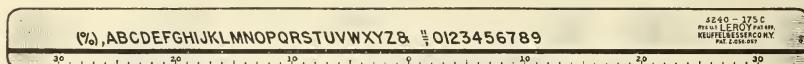


- 3239S.** LEROY Line-spacing Straightedge. Luxylite, 15 in. long, $1\frac{3}{8}$ in. wide. Shows immediately where to place LEROY template to give first line of lettering exactly where it is required. Used with any LEROY template from size 80 to 500, it readily determines spacing between lines best proportioned to height of lettering; non-puncturing device holds straightedge stationary on the drawing.



LEROY TEMPLATES

REG. U. S. PAT. OFF.



LEROY templates are three-ply xylonite, specially selected, seasoned and permanently bonded under heat and pressure. The central lamination is black, the outer two, white. The deeply engraved character grooves pierce the black center section, so that the letters stand out in permanent black-and-white legible contrast. "C" series templates carry the numerical digits, a full alphabet in caps, and a few symbols. "CL" series templates carry the lower case alphabet in addition. On the lower edge is a scale with a central zero by means of which a line of lettering is quickly centered or spaced.

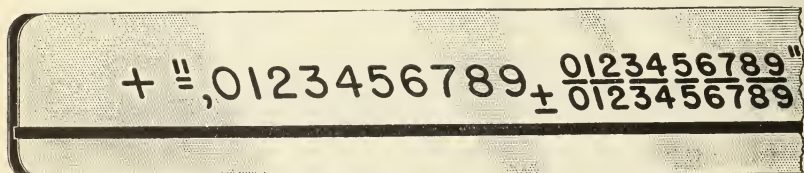
TEMPLATES USED WITH SCRIBERS NO. N3237-1 AND -2.

Templates with Numbers and Capital Letters.	Templates with Numbers Capital and Lower Case Letters.	Length Over-all	Height of Capital Letters Which it Forms.
*†3240-60C.		9 1/2 in.	0.06 in.
3240- 80C.	*†3240-80CL.	9 1/2 "	0.08 "
3240-100C.	3240-100CL.	9 1/2 "	0.10 "
3240-120C.	3240-120CL.	9 1/2 "	0.12 "
3240-140C.	3240-140CL.	9 1/2 "	0.14 "
3240-175C.	3240-175CL.	12 "	0.175 "
3240-200C.	3240-200CL.	12 "	0.20 "
3240-240C.	3240-240CL.	12 "	0.24 "
3240-290C.	3240-290CL.	12 "	0.29 "
3240-350C.	3240-350CL.	15 "	0.35 "
3240-425C.	3240-425CL.	15 "	0.425 "
3240-500C.	3240-500CL.	15 "	0.50 "

† This template requires the use of a special Tracer Pin (No. 3238-3) inserted in Scriber No. N3237-1 or N3237-2 in place of the regular pin.

TEMPLATES USED WITH SCRIBERS NO. N3237-2 AND -3.

3240-700C.	15 in.	0.70 in.
3240-1000C.	18 "	1.00 "
3240-1350C.	24 "	1.35 "
3240-2000C.	24 "	2.00 " approx.



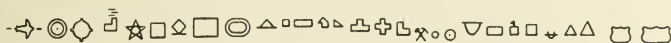
3240F. Numerical Template: 12 in.; will produce numbers in sizes 120C, 140C, 175C and 240C; and fractions with the numerators and denominators in sizes 80C, 100C or 120C.

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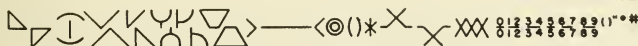
LEROY TEMPLATES (Continued)

LEROY TEMPLATES WITH GRAPHICAL SYMBOLS

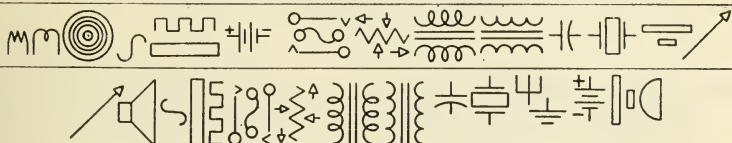
The Illustrations Below are ½ Actual Size.



- 3240A. Map Symbol Template** (with Capital Letters and Numbers, size 80C), 12 in. long. Forms map symbols as illustrated, in addition to all capital letters and numbers that can be formed with template No. 3240-80C. While each map symbol is complete in itself, by combining them, additional symbols can be formed. Map symbols are selected from Planning Survey Memorandum No. 326 of the Public Roads Administration, Washington, D. C., and subsequent revisions. (Use Pen 00 or 0).



- 3240B. Welding Symbol Template** (with Capital Letters and Numbers, size 100C), 12 in. long. Forms welding symbols covering arc, gas and resistance welding, and fractions in size 80C as illustrated; also all capital letters and numbers that can be formed with template No. 3240-100C. This template includes all the welding symbol components adopted by the American Welding Society and approved by the American Standards Association. These components can be combined to form all required welding symbols. (Use Pen 00 or 0.)



- 3240C-10. Electrical Symbol Template**, 12 in. long. Forms electrical symbols for power and communications wiring diagrams. Size and form of symbols on this template and of the combinations which can be made from them are as recommended in "American Standards for Graphical Symbols", published by the American Institute of Electrical Engineers and approved by the American Standards Association. (Use Pen 00 or 0).
- 3240C-5. Electrical Symbol Template**, 9½ in. long. Symbols on this template are exactly the same in form as those on No. 3240C-10, but ½ size. (Use Pen 00 or 0.)
- 3240C-15. Electrical Symbol Template**, 15 in. long. Symbols on this template are exactly the same in form as those on No. 3240C-10, but 1½ size. (Use Pen 00 or 0.)
- *3240C-20. Electrical Symbol Template**, 18 in. long. Symbols on this template are exactly the same in form as those on No. 3040C-10, but double size. (Use Pen 00 or 0.)

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LEROY TEMPLATES (Continued)

LEROY TEMPLATES WITH WORDS & PHRASES (to order)

3240X. Template, in $9\frac{1}{2}$, 12 or 15 in. lengths, to order, with frequently used phrases for drawings or title blocks, or with other wording. In standard LEROY capitals or capitals and lower case letters and numerals. Characters can be made up in any size from 80 to 500.

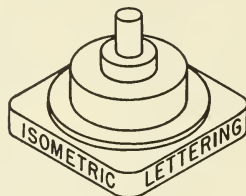
LEROY TEMPLATES WITH SYMBOLS TO CUSTOMER'S DESIGN



K+Σ

3240Y. Template, in any standard size up to 24 in., with symbols, trade marks, characters etc. to your own design not higher than 2.00 in.

LEROY TEMPLATES FOR ISOMETRIC DRAWING



Drawing made with
No. 3241A

Isometric Drawing Templates— Form capital letters and numbers correctly sloped for isometric drawings, and 24 ellipses which are the isometric representation of circles of diameters ranging from $\frac{3}{32}$ to $1\frac{1}{16}$ inches. Illustration shows both lettering and ellipses as they can be formed in all three isometric planes. Available in sizes as follows:

3241A-100C, -120C -140C, -175C or -200C, 12 in.

LEROY TEMPLATES WITH SPECIAL ALPHABETS

Reversed Gothic Templates— Form capital letters and numbers in Reversed Gothic type. Recommended for lettering on the back of tracings, on photographic negatives or wherever reversed writing is required. (Use same pen sizes as for Standard Templates.) Available in sizes as follows:

3241B-80C, -100C, -120C or -140C, $9\frac{1}{2}$ in.

3241B-175C, -200C, -240C or -290C, 12 in.

3241B-350C, -425C or -500C, 15 in.

VWXYΣ&=01S&4&078e

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LEROY TEMPLATES (Continued)

LEROY TEMPLATES WITH SPECIAL ALPHABETS (Cont.)

Condensed Gothic Templates — Form capital letters and numbers in Condensed Gothic type. Average width of lettering is about $\frac{3}{5}$ that of Standard LEROY Lettering. (Use pens one size smaller than for Standard Templates.) Available in sizes as follows:

3241C-140C, $9\frac{1}{2}$ in.

3241C-175C, -200C, -240C or -290C, 12 in.

3241C-350C, -425C or -500C, 15 in.

ABCDEFGHIJK
123456789

Extended Gothic Templates — Form capital letters and numbers in Extended Gothic type. Average width of lettering is about $1\frac{1}{2}$ times that of Standard LEROY Lettering. (Use pens one size larger than for Standard Templates.) Available in sizes as follows:

3241H-80C, -100C, -120C or -140C,
 $9\frac{1}{2}$ in.

3241H-175C, -200C, -240C, or -290C,
12 in.

3241H-350C, -425C or -500C, 15 in.

ABCDEFGH
67890

Outline Gothic Templates — Form capital letters and numbers in Outline Gothic type. (Pen 00 or 0 is recommended). Available in sizes as follows:

3241D-240C or -290C, 12 in.

3241D-350C, -425C or -500C, 15 in.

ABCDE 1 2 3 4

Cheltenham Templates — Form capital letters and numbers in Cheltenham type. Recommended for titling maps and Federal Aid sheets. When used with Pen 00 or 0, an outline is formed which can be readily filled in. Available in sizes as follows:

3241E-240C or -290C, 12 in.

3241E-350C, -425C or -500C, 15 in.

ABCDEF12345

Greek Templates — Form capital and lower case Greek letters. (Use pens one size smaller than for Standard Templates.) Available in sizes as follows:

3241G-140CL or -175CL, $9\frac{1}{2}$ in.

3241G-200CL, -240CL or -290CL, 12 in.

3241G-350CL, -425CL or -500CL, 15 in.

Θ Ι Κ Λ Μ Ν Ξ Ο Π ϵ ζ η θ ι κ λ

KEUFFEL & ESSER CO., NEW YORK

LEROY LETTERING SETS

REG. U. S. PAT. OFF.

IN HIGH GRADE WOODEN CASES

TEMPLATES HAVE NUMBERS AND CAPITAL LETTERS

(See Following Page for Contents of Each Set.)

- N3245-6. Leroy Lettering Set, with 6 templates and 6 pens.
- N3245-10. Leroy Lettering Set, with 5 templates and 5 pens.
- N3245-12. Leroy Lettering Set, with 8 templates and 10 pens assorted sizes.
- N3245-15. Leroy Lettering Set, with 11 templates and 10 pens.

TEMPLATES HAVE NUMBERS, CAPITAL AND LOWER CASE LETTERS

(See Following Page for Contents of Each Set.)

- N3245-6L. Leroy Lettering Set, with 6 templates and 6 pens.
- N3245-10L. Leroy Lettering Set, with 5 templates and 5 pens.
- N3245-12L. Leroy Lettering Set, with 8 templates and 10 pens assorted sizes.
- N3245-15L. Leroy Lettering Set, with 11 templates and 10 pens.

PLAIN WOODEN CASES ONLY

- 3246-4. Plain Wooden Case, $15 \times 1\frac{7}{8} \times 1\frac{1}{2}$ in. over all, to accommodate any 8 assorted $9\frac{1}{2}$ in. Leroy Templates, 4 Leroy Pens, and Scriber.
- 3246-10. Plain Wooden Case, $16 \times 3\frac{1}{4} \times 1\frac{1}{2}$ in. over all, to accommodate any 8 assorted 12 in. and 15 in. Templates; any 8 assorted $9\frac{1}{2}$ in. Templates; 10 Leroy Pens, and Scriber.
- 3246-20. Plain Wooden Case, $27\frac{1}{4} \times 4 \times 1\frac{1}{2}$ in. over all, to accommodate any 8 assorted 18 in. and 24 in. Templates; any 8 assorted $9\frac{1}{2}$, 12 and 15 in. Templates; 10 Leroy Pens, size No. 3233-8N and smaller; 6 Leroy Pens, size No. 3233-9 and larger; Leroy Scriber No. N3237-1 or No. N3237-2; and Leroy Scriber No. N3237-3.

Cases Nos. 3246-4, -10, and -20, plain finish, do not have a separate space for each template, as in the highgrade cases of sets Nos. N3245-6, to -15L.

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CONTENTS OF LEROY LETTERING SETS

REG. U. S. PAT. OFF.

EACH SET CONTAINS ONE EACH OF THE ITEMS INDICATED BY (X)		N3245-6	N3245-6L	N3245-10	N3245-10L	N3245-12	N3245-12L	N3245-15	N3245-15L
Templates No. 3240- 80C									
	-100C	X				X		X	X
	-100CL		X				X		X
	-120C	X				X		X	
	-120CL		X				X		X
	-140C	X		X		X		X	
	-140CL		X		X		X		X
	-175C	X		X		X		X	
	-175CL		X		X		X		X
	-200C	X				X		X	
	-200CL		X				X		X
	-240C	X		X		X		X	
	-240CL		X		X		X		X
	-290C							X	
	-290CL								X
	-350C			X		X		X	
	-350CL				X		X		X
	-425C							X	
	-425CL								X
	-500C			X		X		X	
	-500CL				X		X		X
Pens No. 3233 -00		X	X			X	X	X	X
	-0	X	X			X	X	X	X
	-1	X	X	X	X	X	X	X	X
	-2	X	X	X	X	X	X	X	X
	-3	X	X	X	X	X	X	X	X
	-4	X	X	X	X	X	X	X	X
	-5					X	X	X	X
	-6			X	X	X	X	X	X
	-7N					X	X	X	X
	-8N					X	X	X	X
Scriber No. N3237-2*		X	X	X	X	X	X	X	X
Penholder No. 3235		X	X	X	X	X	X	X	X
Socket Holder No. 3234-1		X	X	X	X	X	X	X	X
Lead Holder No. 3238-1		X	X	X	X	X	X	X	X
Scriber Stand No. 3238-10		X	X	X	X	X	X	X	X
High Grade Wooden Case		X	X	X	X	X	X	X	X

*If Fixed Scriber No. N3237-1 is preferred, the price of the set is reduced by the difference in price of the two scribers.

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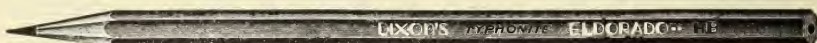
LEAD PENCILS

ACCURATE



3350. Accurate Drawing Pencils, Johann Faber, blue, gilt, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H.

ELDORADO



3352. Eldorado Drawing Pencils, yellow polish, gilt, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.

VENUS



3356. Venus Drawing Pencils, crackled green finish, edgeless, 6B, 5B, 4B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.

TURQUOISE



3360. Turquoise Drawing Pencils, turquoise blue finish, slightly rounded edges, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.



3361. Turquoise Lead Holders, turquoise blue finish, with degree indicator, Each holder takes all degrees of leads No. 3362 4B to 6H. Indicator can be changed to identify degree of lead used.
3362. Turquoise Drawing Leads for Lead Holders, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H; box of 6.

VAN DYKE MICROTOMIC



3370. Van Dyke Microtomic Pencils, yellow polish, 7B, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.

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LEAD PENCILS

(CONTINUED)

MARS LUMOGRAPH



3376. Mars Lumograph Pencils, blue polish, J. S. Staedtler Inc., EX, EXB, 6B, 5B, 4B, 3B, 2B, B, HB, FH, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.
- 3377A. Mars Lumograph Lead Holder, hexagon, blue polish, refillable from top; HB, F, H, 2H, 3H, 4H.

MARS LUMOGRAPH LEADS

- 3377L. Mars Lumograph Leads for Lead Holders, HB, F, H, 2H, 3H, 4H; box of 6.

WINNER TECHNO-TONE



- N3378. Winner Techno-Tone Pencils, A. W. Faber, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H.

CASTELL



3379. Castell Pencils, A. W. Faber, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.

KOH-I-NOOR



3380. Koh-i-noor Pencils, yellow polish, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.



3383. Koh-i-noor Draftsman's Lead Holders, yellow polish, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H.
3385. Koh-i-noor Leads for Lead Holders, 6B, 5B, 4B, 3B, 2B, B, HB, F, H, 2H, 3H, 4H, 5H, 6H, 7H, 8H, 9H; box of 6.
3386. Koh-i-noor Compass Leads, HB, H, 2H, 3H, 4H; box of 6.

KEUFFEL & ESSER CO., NEW YORK

COLORED PENCILS



3393. Eberhard Faber's Mongol Colored Indelible Pencils.

No. 849. Black	No. 868. Green, dark	No. 862. Orange
" 865. Blue, dark	" 898. " French	" 846. Pink
" 845. " light	" 848. " Light	" 844. Purple
" 855. " Prussian	" 888. " Olive	" 866. Red
" 863. Brown	" 858. " Prussian	" 813. Terra Cotta
" 893. " Vandyke	" 819. Grey	" 841. White
" 876. Carmine	" 864. Heliotrope	" 867. Yellow
" 803. " Burnt	" 853. Ochre, Brown	" 817. Lemon

3394. Box containing one dozen Mongol Indelible Pencils, including Black, Pink, Dark Blue, Brown, Carmine, Light Green, Dark Green, Heliotrope, Orange, Purple, Red and Yellow; with directions for use.



3397. Dixon's Colored Pencils.

No. 331 Black	No. 254½ Green, Light	No. 321½ Red, Lake
" 350 Blue	" 325 " Olive	" 351 " Terra Cotta
" 320 " Sky	" 324 Orange	" 323 Violet
" 330 " Ultramarine	" 322 Pink	" 352 White
" 343 Brown	" 323 Purple	" 353 Yellow, Golden
" 352½ Gray	" 349 Red	" 324½ " Ochre
" 354 Green		

3398. Box containing one dozen Dixon's Colored Pencils including Black, Blue, Brown, Gray, Green, Orange, Red, Red Lake, Violet, White, Golden Yellow and Yellow Ochre.



3399. Dixon's Thinex Colored Pencils.

No. 370. Red	No. 373. Yellow
" 390W. White	" 376. Blue



3400. Van Dyke Blueprint Pencils.

No. 651. White	No. 656. Red
" 655. Blue	" 657. Yellow

LUMBER CRAYONS

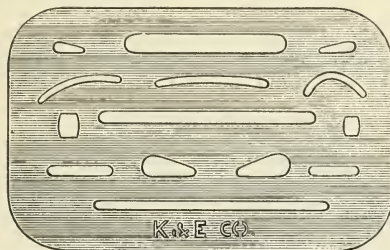


No. 3405.

3404. FAVORITE Lumber Crayons, $4\frac{3}{4} \times \frac{1}{2}$ in., paper covered, Black, Blue, Red and Yellow.
3405. Dixon's Lumber Crayons, $4\frac{1}{2} \times \frac{1}{2}$ in., paper covered, Carbon Black, Yellow, Red, Blue, Green.

KEUFFEL & ESSER CO., NEW YORK

ERASING SHIELDS



No. N3409.

- N3409. Erasing Shield, Stainless Steel; $2\frac{3}{4} \times 3\frac{3}{4}$ in.
 3412. Erasing Shield, Xylonite; $2\frac{3}{8} \times 3\frac{3}{4}$ in.

ERASERS



3453. Pink Pearl Eraser, large, oblong, wedge edge, $2\frac{1}{2} \times 1\frac{3}{16} \times \frac{7}{16}$ in.



- 3460A. Art Gum, $1\frac{1}{8} \times 1\frac{1}{8} \times 1\frac{1}{8}$ in.
 3460B. " " $2 \times 1 \times 1$ "
 3460C. " " $2\frac{1}{2} \times 1\frac{1}{8} \times 1\frac{1}{8}$ "
 3460D. " " $3 \times 2 \times 1$ "
 3460E. " " $3 \times 3 \times 2$ "



- 3456R-1. Red, medium, both ends wedge shape, $2\frac{1}{2} \times \frac{5}{8} \times \frac{5}{16}$ in.

- 3456R-2. Red, large, both ends wedge shape, $3\frac{1}{2} \times 1\frac{1}{8} \times \frac{3}{8}$ in.



- 3461B. K & E Gum Eraser and Cleaner, $2 \times 1 \times 1$ in.



3457. VAN DYKE Soft Ink Eraser, $2\frac{3}{4} \times 1\frac{3}{16} \times \frac{3}{8}$ in.



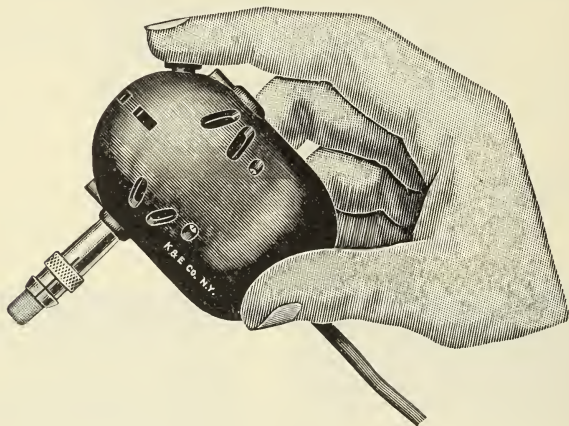
3470. Felt Eraser for Dupro, $\frac{1}{4} \times \frac{1}{2} \times 1\frac{1}{2}$ in., box of five.

KEUFFEL & ESSER CO., NEW YORK

K & E MOTORASER

TRADE MARK

ELECTRIC ERASING MACHINE



This small electric erasing machine cleans large areas rapidly and with no appreciable effort. It reduces erasing time to seconds, and physical effort to nothing at all. Speed, not pressure, makes the erasure; an insurance in itself that holes will not be worn in the drawing. The control switch is directly under the finger tip.

The K & E **MOTORASER** is a rugged mechanism, housed in a minimum of space. It weighs only six ounces, and fits the palm of the hand. The housing, of moulded composition, is only 3 inches long, by 2½ inches in diameter. It has no corners or sharp edges. The high speed erasing point can be directed as accurately as a pencil point.

This erasing machine is built for long and economical service. The housing will not dent, nor will its finish crack or chip off. The eraser chuck is turned from solid stock and will hold its alignment permanently. Accessible brush holders provide for quick, easy brush replacement whenever necessary after extensive use.

It is designed for use with 60 cycle alternating current (110 volt). For direct current it should be used with adapter No. 3474R.

3474A **MOTORASER**, for 110 volts AC, complete with 6 ft. electric cord, plug and 6 each erasers Nos. 3474-10 and 3474-11.

3474R. Adapter for using No. 3474A with 110 volts DC.

3474-10. Pencil Eraser for No. 3474A.

3474-11. Ink Eraser for No. 3474A.

KEUFFEL & ESSER CO., NEW YORK

STEEL ERASERS



3481. Steel Eraser with long blade, Coco Handle.



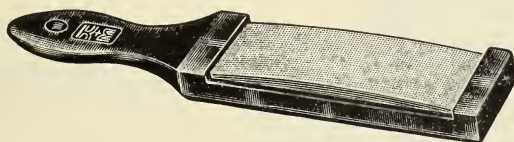
3486. Steel Eraser with short blade, Coco Handle.

LEAD PENCIL FILE



3488. Lead Pencil File and Tack Lifter, 6 in.

PENCIL POINTERS



No. 3505.

Plastic Refillable Pencil Pointer No. 3505 is made of dark green plastic. 12 refill sheets are held firmly by a spring, but can be removed singly without loosening the rest. Refills are easily inserted.

3505. Refillable Pencil Pointer, plastic, $7\frac{1}{2}$ in. length, furnished with 12 Flint Paper Sheets in the holder and 24 extra sheets.
- 3505E. Emery Paper Refills, package of 12 sheets, $1\frac{1}{4}$ x 4 in., for refillable Pencil Pointer No. 3505.
- 3505F. Flint Paper Refills, package of 12 sheets, $1\frac{1}{4}$ x 4 in., for refillable Pencil Pointer No. 3505.



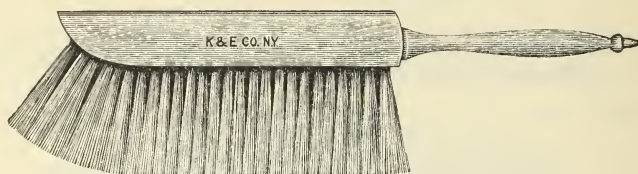
No. 3508.

This Pencil Pointer consists of 12 sheets of abrasive paper made into a block

3507. Pencil Pointer, flint paper, with wooden handle. Block $1 \times 3\frac{1}{4}$ in.
3508. Pencil Pointer, similar to No. 3507, but emery paper.

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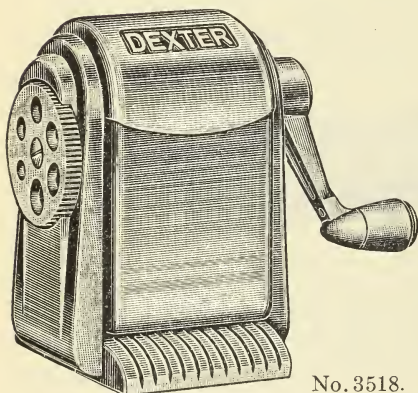
DUSTING BRUSHES



No. 3510.

- 3510.** Dusting Brush, $2\frac{1}{2}$ in. white bristle, staple set in hardwood, 13 inches long, 5 in. handle. Finest quality flat beveled style, which lies flat and which stows away readily in a drawer or pigeon hole.
- 3511.** Dusting Brush, 2 in. bristles, staple set in hardwood, $14\frac{1}{2}$ in. long, 6 in. handle.

PENCIL SHARPENERS



No. 3518.



Showing lead exposed when
No. 3518 is used.

The twin milling cutters of the Dexter Pencil Sharpener are made of the best tool steel; a guarantee of long service.

The gray plastic shavings receptacle adjusts itself to any position. Consequently, the sharpener can be suspended from above, placed on the wall, or fastened to desk or table. These machines are of the highest grade workmanship and are beautifully finished.

N3517. Dexter Pencil Sharpener, steel frame, enameled in gray.

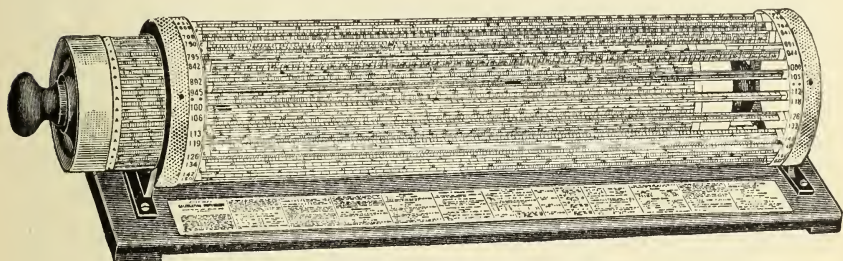
No. N3517 sharpens all sizes of pencils, and has a point adjuster which enables the user to produce any desired point from blunt to fine. When the pencil is thoroughly sharpened the cutters no longer function, which feature necessarily makes for considerable saving in pencil expense.

3518. Dexter Pencil Sharpener, steel frame, enameled in gray, fitted with draftsman's special cutters.

These cutters of No. 3518 take off the wood only, leaving the lead exposed. The lead may be pointed on a file or sandpaper to suit requirements.

KEUFFEL & ESSER CO., NEW YORK

THACHER'S CALCULATING INSTRUMENT



No. N4012.

N 4012. Thacher's Calculating Instrument, cylinder 18 in.; in polished mahogany Box, with full Directions.

Thacher's Calculating Instrument is a device for performing a great variety of useful arithmetical calculations with rapidity and accuracy. Its operation is simple and is readily learned. By its use the tedious drudgery of calculation is avoided and the chance of error eliminated.

As is shown in the illustration, the instrument consists of a cylinder 4 in. in diam. and 18 in. long, which revolves in an open framework composed of 20 angular bars held between two metal rings. The cylinder bears a scale corresponding to the scale of the Slide Rule, which is duplicated on the exposed sides of the bars. Results can be obtained to the fourth, and often to the fifth place of figures, and are correct to about one part in 10,000 (.01 of 1 per cent), which is sufficient for nearly every requirement of the professional or business man. Examples in multiplication, division, proportion and powers or roots involving not more than three quantities, are solved by one operation and any number of values of an algebraic function composed of two constants and a single variable may generally be found by one setting.

The useful applications of the instrument are almost unlimited; among them may be mentioned: finding the stresses and sections in trusses and girders, mensuration, estimates of work and material, solving trigonometrical formulæ, making and applying tables, problems in mechanical powers, machinery and hydraulics, problems in simple and compound interest, discount, prorating, the conversion of weights and measures, cost of merchandise with per cent. of duty or profit added.

For example, any of the formulæ

$$\frac{ax}{b}, \quad \frac{ax^2}{b}, \quad \frac{ax}{b^2}, \quad \frac{ax^2}{b^2}, \quad \sqrt{\frac{ax}{b}}, \quad \sqrt{\frac{a^2x}{b}}$$

in which a and b may have any values and x any number of values, are readily solved by one setting. Squares, square roots, cube roots and reciprocals are also readily worked.

The following are a few problems which may be readily solved by the use of Thacher's Calculating Instrument:

A 15-in. "I" beam, resting upon supports 14.5 ft. apart sustains a load of 17500 lbs. at the center. What weight of beam is required if $S = 10000$ lbs. per sq. in.? (This problem is solved in three settings of the instrument.)

\$541.36 are to be divided prorata among various accounts amounting to \$7436.00 Required, the amount, going to account of \$127.50, \$763.80, etc. (The several amounts are each found in one setting.)

A train weighing 2500 lbs. per lineal foot passes over a bridge on a 4° curve at a speed of 30 miles an hour; required, its effect upon the lateral system. (This problem is solved in one setting.)

What will be the amount of \$250.00 placed at compound interest for 10 years at 6%? (This problem is solved in one setting.)



KEUFFEL & ESSER CO., NEW YORK

K & E

SLIDE RULES

The **Slide Rule** is an instrument for performing various arithmetical, algebraical and trigonometrical calculations by mechanical means. The theory of the rule is simple, and easily learned; and but little practice is necessary to attain proficiency in its use.

As a time saver the Slide Rule is unequalled, and for all practical purposes it gives results with a degree of accuracy and rapidity that soon make its use indispensable to the Engineer, Scientist, Merchant or Student. Problems can be solved in a fraction of the time required by the usual arithmetical processes.

Particular attention is called to the slide rules described on pages 234 to 239 inclusive, in which all of the scales have been so arranged that anyone understanding the method governing the operation of the usual scales, will be able to employ the rule for all operations involving arithmetic, evolution, involution, trigonometry, and logarithms to any base, either separately or in conjunction with one another, without being troubled to remember a different method for each different type of problem.

K & E Slide Rules are made of the finest obtainable materials, and an entire department of our large factory is devoted exclusively to their manufacture. Numerous features are patented and are not found in other rules.

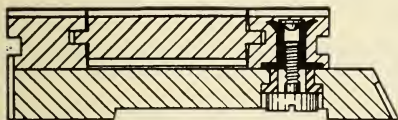
KEUFFEL & ESSER CO., NEW YORK

K & E SLIDE RULES

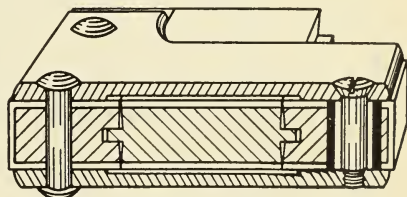
K & E SLIDE ADJUSTMENT

It is well known that the materials of which most slide rules are made (wood, xylonite or celluloid) are affected by atmospheric changes. Under ordinary conditions these changes have no effect upon K & E slide rules; in which the liability of shrinking and swelling has become a nearly negligible factor, due to the use of the most approved processes in the seasoning treatments of the materials employed. Under extreme conditions, however, shrinkage or swelling may become so marked as to interfere with the smoothness of operation of the slide. Consequently, some means is required to readjust the rule.

Before the K & E slide rule adjustment was devised, various means had been adopted to take care of appreciable shrinkage and swelling; but each of these had some serious drawback. None of the so-called "automatic" adjustments, for instance, has proved practicable in use. Those in which the base or stock, cut lengthwise into halves, is held together by springs, soon become useless through uneven shrinkage, and do not afford a rigid bed for the slide; while those which depend upon springs to hold one edge of the slide against the rule, become objectionable because of the gap which appears between the rule and the opposite edge of the slide.



Mannheim Rules.



DUPLEX* Rules.

Cross section of K & E Slide Rules showing Slide Adjustment.

The **K & E Slide Adjustment**, by successfully overcoming these drawbacks, has solved the problem perfectly. In the Mannheim type rules, one of the grooved guide pieces (in which the slide moves) is in a separate piece from the body of the rule, to which it is secured by means of set screws. These setscrews pass through oblong slots in the body of the rule into threaded metal bushings in the adjustable guide piece. This construction, while insuring that the guide piece will be held rigidly in place when the screws are tight, permits it to be moved away from or toward the slide when the screws are loosened. Hence, should adjustment become desirable, it is only necessary to loosen the screws, bring the guide piece against the slide according to the friction desired, and tighten the screws again.

In the **DUPLEX*** slide rule, the metal end pieces, which join the two side bars of the stock, are provided with set screws which pass through oblong slots in one of the side bars. Adjustment is made by releasing the setscrew at each end of the bar, shifting the bar toward or away from the slide to give the desired friction, and then tightening the screws.

NUMBERING OF SLIDE RULES

Great care has been taken to make the numbering of the graduations as distinct and permanent as possible. Since *sub-numbers* are not required by the adept, and tend to confuse and hinder beginners, we do not regularly number the sub-divisions throughout.

* REG. U. S. PAT. OFF.

KEUFFEL & ESSER CO., NEW YORK

POLYPHASE SLIDE RULES

REG. U. S. PAT. OFF.

MANNHEIM TYPE

10-INCH RULE.

N 4053-3. POLYPHASE (Mannheim) Slide Rule, **K & E Adjustable**, 10 in., engine divided, divisions on white facings, improved Glass Indicator; in Case, with Directions.

N 4053-3S. Same as No. N4053-3 but in sewed Leather Case.

20-INCH RULE.

N 4053-5. POLYPHASE (Mannheim) Slide Rule, **K & E Adjustable**, 20-in., engine divided, divisions on white facings, improved Glass Indicator; in Case, with Directions.

N 4053-5S. Same as No. N4053-5 but in sewed Leather Case.

The front face carries the following scales:-

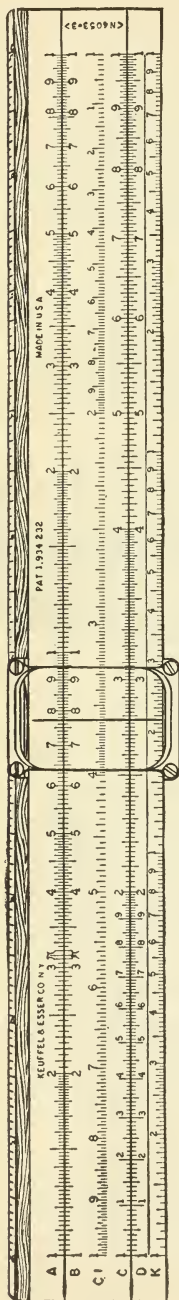
- A and B** - Each a 2 unit logarithmic scale.
Used in finding squares and square roots.
- CI** - A single unit logarithmic scale inverted.
Used in finding reciprocals, and in multiplication of 3 factors with one setting.
- C and D** - Each a single unit logarithmic scale.
The basic scales used in multiplication, division, proportion, etc.
- K** - A 3 unit logarithmic scale.
Used in finding cubes, cube roots, etc.

On the back of the slide are the following scales:-

- S** - Sines of angles, a 2 unit scale.
- L** - A scale of equal parts.
Used in finding powers and roots by the logarithmic method.
- T** - Tangents of angles, a single unit scale.

The back of the rule carries a table of equivalents.

One edge is beveled and carries an inch scale divided to 16ths; the other edge carries a centimeter scale divided to millimeters.



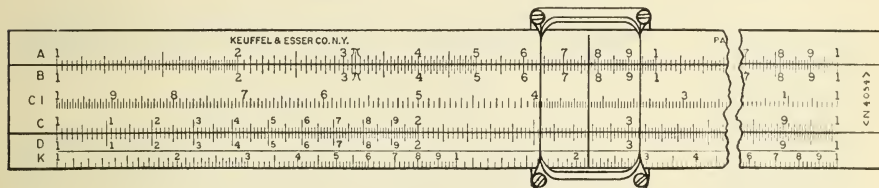
No. N4053-3.



POLYPHASE SLIDE RULE

REG. U. S. PAT. OFF.

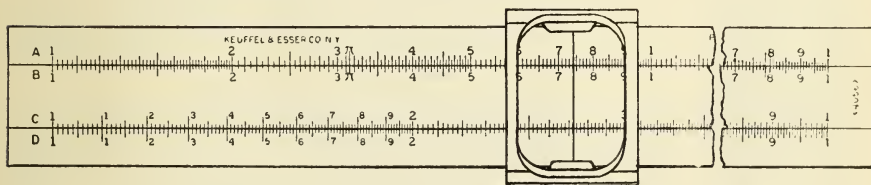
MANNHEIM TYPE.



- 4054. POLYPHASE (Mannheim) Slide Rule, K & E Adjustable, 10 in.,** engine divided, divisions on white facings, with improved Glass Indicator; in Case, with Directions. This slide rule has all the scales of No. N40 3-3 except the inch and centimeter scales.

FAVORITE SLIDE RULES.

TRADE MARK

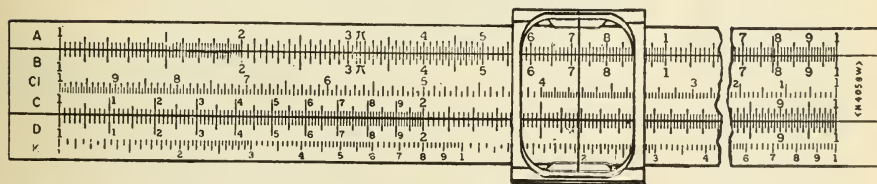


No. 4056.

- 4056. FAVORITE (Mannheim) Slide Rule, K & E Adjustable 10 in.,** divisions on white facings, with plain frame Glass Indicator; in plain Case, with Directions. This slide rule has all the scales of No. 4054 except the CI and K scales.

BEGINNERS' SLIDE RULE.

TRADE MARK



No. N4058 W.

- N4058W. BEGINNERS' Slide Rule (Mannheim), 10 in.,** graduations on white finish, with plain frame Glass Indicator, in sheath with Directions. This slide rule has all the scales as No. 4054.

The **BEGINNERS' Slide Rule** is intended only for the use of beginners to enable them to become familiar with the slide rule without incurring the expense of obtaining the regular rule intended for professional use.

KEUFFEL & ESSER CO., NEW YORK

POLYPHASE DUPLEX TRIG

TRADE MARK

AND

POLYPHASE DUPLEX DECI TRIG

TRADE MARK

SLIDE RULES

The great improvements which these slide rules exhibit lie not only in the addition of the folded scales (see page 235) but, in the fact that while the trigonometrical scales are on the slide, as in most slide rules, they are all referred to the C, D, CI and DI scales. Hence, it is possible to take all the trigonometric functions as factors in any operation, without paying attention to their numerical values; so that, in multiplication, division, etc., the trigonometrical scales can be handled exactly like the C and CI scales. Also, due to the double numbering of the scales, all six usual trigonometric functions can be handled in the same problem by direct means and continuous operation, as follows:

Example: $x = \frac{4 \sin 38^\circ}{\tan 42^\circ}$

To 4 on scale D set 42° on scale T.

At 38° on scale S read $x = 2.735$ on scale D.

Example: $x = \frac{555 \cos 75^\circ \sqrt{193}}{5.5 \cot 81^\circ 30'}$

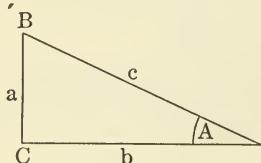
To 555 on scale D set $81^\circ 30'$ on scale T.

Indicator to 75° (red) on scale S.

5.5 on scale C to Indicator.

Indicator to 193 on scale B.

Under Indicator read 2425 on scale D.



The rearrangement of the trigonometrical scales is of great convenience in solving the right triangle (on which vector problems are based), including the determination of both acute angles, by the use of familiar methods, as follows:

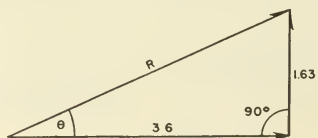
Example: Given $a=3$, $b=4$. Find A and c.

To 4 on D set index of slide.

At 3 on D read $A=36.9^\circ$ on T.

To 3 on D set 36.9° on S.

At index of slide read $c=5$ on D.



Example: Find the magnitude and the angle of the vector representing the complex number $3.6 + j1.63$ where $j = \sqrt{-1}$.

To 3.6 on D set index of slide.

At 1.63 on D read $\theta = 24.4^\circ$ on T.

To 1.63 on D set 24.4° on S.

At index of slide read $R=3.95$ on D.

The preceding methods can be applied most conveniently to all problems dealing with the right triangle. By means of scale DI another method can be used to solve most right triangles, with but one setting of the slide.

The above solutions of the right triangle apply to the scales on No. 4071-3, but the operation on No. 4070-3 is exactly the same, except that the angles are given in degrees and minutes.

KEUFFEL & ESSER CO., NEW YORK

POLYPHASE DUPLEX TRIG TRADE MARK AND POLYPHASE DUPLEX DECITRIG TRADE MARK SLIDE RULES

4070-3. POLYPHASE DUPLEX TRIG Slide Rule, K & E
Adjustable, 10 in., engine divided, divisions on white facings, improved Glass Indicator; with Trigonometrical Scales divided to represent degrees and minutes; in Case, with Directions.

4070-3S. Same as No. 4070-3, but in sewed Leather Case.

4071-3. POLYPHASE DUPLEX DECITRIG Slide Rule,
Like No. 4070-3 but with Trigonometrical Scales divided to represent degrees and decimals of a degree.

4071-3S. Same as No. 4071-3, but in sewed Leather Case.

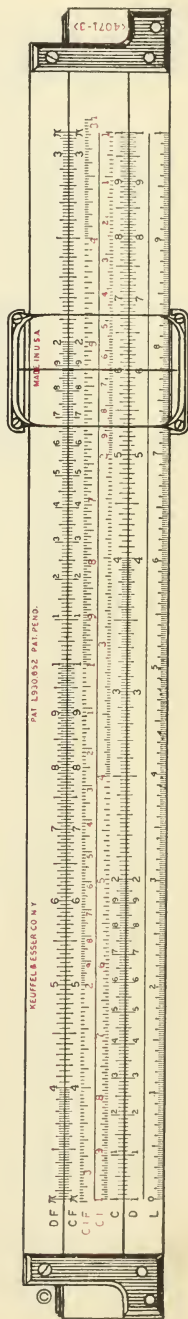
These slide rules, which are graduated on both sides, have all the scales of the **POLYPHASE*** Slide Rule, (see page 232) with the addition of four others—three of which (CF, DF and CIF) are known as the folded scales, and one (DI), as the inverted D scale. The trigonometrical scales have been expanded and rearranged. Nos. 4070 and 4071 are alike, except that the trigonometrical scales of No. 4070 are divided to represent degrees and minutes, whereas those of No. 4071 are divided to represent degrees and decimals of a degree.

On one face are the following scales:

- DF,** a full length D scale folded. This arrangement admits of the handling of factors which, in rules without these scales, would frequently require the slide to be reset. Since the constant π is in alignment with the indices of the C and D scales, π can be taken as a factor or divisor in any formula without an additional setting.
- CF,** a full length C scale, folded like the DF scale.
- CIF,** a full length inverted folded scale, giving reciprocals of numbers on the CF scale. The inverted scale in connection with the direct scales admits of handling three factors with one setting of the slide, or four factors if π is included.
- CI,** a full length C scale inverted.
- C,** a single logarithmic scale.
- D,** a single logarithmic scale like C.
- L,** a scale of equal parts (for finding common logarithms of numbers).

On the reverse face are the following scales:

- K,** a three unit logarithmic scale, giving directly cubes and cube roots.
- A,** a two unit logarithmic scale giving directly squares and square roots.
- B,** a two unit logarithmic scale exactly like A.
- T,** a full length scale of Tangents and Cotangents, double numbered from $5^{\circ}43'$ or 5.72° to $84^{\circ}17'$ or 84.28° .
- ST,** a full length scale of Sines and Tangents, numbered from $0^{\circ}34'$ or 0.58° to $5^{\circ}44'$ or 5.73° .
- S,** a full length scale of Sines and Cosines, double numbered from $5^{\circ}44'$ or 5.73° to 90° for sines, and from 0° to $84^{\circ}16'$ or 84.26° for cosines.
- D,** a single logarithmic scale.
- DI,** a full length D scale inverted.



No. 4071-3. Front.

KEUFFEL & ESSER CO., NEW YORK

LOG LOG DUPLEX TRIG

TRADE MARK

AND

LOG LOG DUPLEX DECITRIG

REG. U. S. PAT. OFF.

SLIDE RULES

Since these slide rules have all* the scales of Nos. 4070 and 4071, they can be employed for exactly the same purposes, and in exactly the same manner, as described on pages 234 and 235. However, since they are also equipped with Log Log Scales, and with legends as described below, their scope is greatly increased.

One of the most difficult problems of elementary mathematics is that of finding the value of a power of a number. By means of the Log Log scales the process of doing this is as easy as the process of multiplication or division. Not only are such simple expressions as 2^5 , 1.5^7 , and 0.85^4 easily evaluated but also the more complex expressions such as 1.894^2 , 0.591^{25} , $e^{5.6}$ and $1.036^{-5.34}$ are computed with the same ease.

The three LL scales LL1, LL2 and LL3 represent a range of numbers from 1.01 to 22,000, while the corresponding LLO scales LLO1, LLO2 and LLO3 range from 0.99 to 0.00005. All these scales are the full unit length, thus conveniently referring directly to the C and D scales. This arrangement has other important advantages. For instance, reciprocals can be read between mated LL and LLO scales almost instantly with 5-place and sometimes even 6-place accuracy. Hyperbolic functions can be quickly evaluated from a single setting of the indicator. Still more important, all confusion is avoided in finding any power of any number, whether it be positive or negative, whether integral or decimal.

The Legends

The "legends" or range numbers, "0.1 to 1.0", "0.01 to 0.1" etc., at the right of the trigonometric and Log Log Scales are very useful.

For example, the S scale legend 0.1 to 1.0 indicates the left limit $\sin 5.74^\circ (5^\circ 44') = 0.1$ and the right limit $\sin 90^\circ = 1.0$ when read on scale C. Similarly the ST legend 0.01 to 0.1 indicates the range of this scale $\sin 0.57^\circ (0^\circ 34') = 0.01$, to $\sin 5.74^\circ 5^\circ 44' = 0.1$. Thus to find $\sin^{-1} 0.0631$ we read from scale C to ST, not to S, because 0.0631 is between 0.01 and 0.1. The tangent scale T contains two legends, one in black for reference to scale C, one in red for reference to scale CI. The legends are based on: $\tan 5.71^\circ (5^\circ 43') = 0.1$, $\tan 45^\circ = 1.0$, $\tan 84.29^\circ (84^\circ 17') = 10.0$. This is a great convenience in avoiding confusion in the double use of this scale.

The legends on each of the six Log Log scales represent the limits of powers of e. The three LL scales present a continuous range from $e^{0.01}$ to e^{10} , while the three LLO scales range from $e^{-0.01}$ to e^{-10} . The numerical values of such expressions as $e^{7.4}$, $e^{-0.13}$, $e^{1.22}$, e^{-3} , $e^{0.056}$ are quickly found without using the slide, by setting the hairline to the exponent on D and reading the value on a Log Log scale. The legends indicate the correct Log Log scale on which to read the answer.

The trigonometric and the Log Log legends may often be used in combination. For example, the polar equation of a certain curve is $V = e \tan m$; to find V when $m = 37^\circ$, read the answer opposite 37° of scale T on LL2. The LL2 scale was selected because it is the one whose legend 0.1 to 1.0 is the same as that of the T scale for 37° . To find V when $m = 2.6^\circ$, read the answer on the LL1 scale for a similar reason.

*Except the DI scale.

KEUFFEL & ESSER CO., NEW YORK

LOG LOG DUPLEX TRIG TRADE MARK AND LOG LOG DUPLEX DECITRIG REG U S. PAT. OFF. SLIDE RULES

N4080-3. LOG LOG DUPLEX TRIG Slide Rule, K & E Adjustable, 10 in., engine divided, divisions on white facings, improved Glass Indicator; with Trigonometrical Scales divided to represent degrees and minutes; in Case, with Directions.

N4080-3S. Same as No. N4080-3, but in sewed Leather Case.

N4080-5. Similar to No. N4080-3, but 20 in.

N4080-5S. Same as No. N4080-5, but in sewed Leather Case.

N4081-3. LOG LOG DUPLEX DECITRIG Slide Rule, like No. N4080-3, but with Trigonometrical Scales divided to represent degrees and decimals of a degree.

N4081-3S. Same as No. N4081-3, but in sewed Leather Case.

N4081-5. Similar to No. N4081-3, but 20 in.

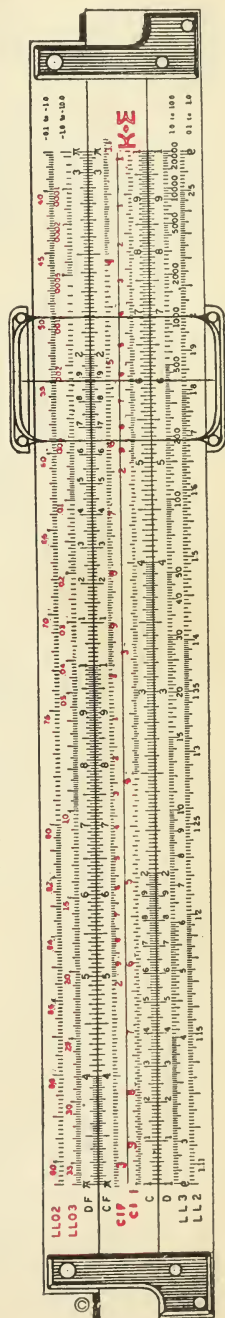
N4081-5S. Same as No. N4081-5, but in sewed Leather Case. Nos. **N4080** and **N4081** are alike except that the trigonometrical scales of No. **N4080** are divided to represent degrees and minutes, whereas those of No. **N4081** are divided to represent degrees and decimals of a degree.

On one face are the following scales:

- LL02** a Log Log scale of range 0.905 ($e^{-0.1}$) to 0.368 (e^{-1})
- LL03** a Log Log scale of range 0.368 (e^{-1}) to 0.00005 (e^{-10})
- DF** a full length D scale folded. This arrangement admits of the handling of factors which, in rules without these scales, would frequently require the slide to be reset. Since the constant π is in alignment with the indices of the C and D scales, π can be taken as a factor or divisor in any formula without an additional setting.
- CF** a full length C scale, folded like the DF scale.
- CIF** a full length inverted folded scale, giving reciprocals of numbers on the CF scale. The inverted scale, in connection with the direct scales, admits of handling three factors with one setting of the slide, or four factors if π is included.
- CI** a full length C scale inverted.
- C** a single logarithmic scale.
- D** a single logarithmic scale like C.
- LL3** a Log Log scale of range 2.718 (e^1) to 22000 (e^{10}).
- LL2** a Log Log scale of range 1.105 ($e^{0.1}$) to 2.718 (e^1).

On the reverse face are the following scales:

- LL01** a Log Log scale of range 0.99 ($e^{-0.01}$) to 0.905 ($e^{-0.1}$).
- K** a three unit logarithmic scale, giving directly cubes and cube roots.
- A** a two unit logarithmic scale giving directly squares and square roots.
- B** a two unit logarithmic scale like A.
- T** a full length scale of Tangents and Cotangents, double numbered; of range $5^{\circ}43'$ or 5.71° to $84^{\circ}17'$ or 84.29° .
- ST** a full length scale of Sines and Tangents, of range $0^{\circ}34'$ or 0.57° to $5^{\circ}44'$ or 5.74° .
- S** a full length scale of Sines and Cosines, double numbered of range $5^{\circ}44'$ or 5.74° to 90° for Sines, and 0° to $84^{\circ}16'$ or 84.26° for Cosines.
- D** a single logarithmic scale.
- L** a scale of equal parts (decimal exponents of 10).
- LL1** a Log Log scale of range 1.01 ($e^{0.01}$) to 1.105 ($e^{0.1}$).



No. N4081-3, Front.

KEUFFEL & ESSER CO., NEW YORK

LOG LOG DUPLEX VECTOR

REG. U. S. PAT. OFF.

SLIDE RULE

The value of the Hyperbolic Functions will best be appreciated by Electrical Engineers dealing with steady-state power or telephone transmission. For instance, where the constants and terminal conditions of an alternating-current line-conductor are known, the potential, current, and power can be computed, through the use of these scales, in a fraction of the time (and with far less labor) required by any other means.

The following example indicates the ease of the slide rule solution:

Find the steady-state current flowing into the short circuit at the end of a transmission line of No. 10 B & S gauge copper wire whose length $S=25$ miles; whose propagation constant $p=0.0292 \angle 71.8^\circ$ complex hyperbolic radians; whose characteristic impedance $Z_0=723 \angle -11.1^\circ$ vector ohms; and whose difference of potential impressed at the sending end, $V_s=100 \angle 0^\circ$ volts at a frequency of 800 cycles per second.

The steady-state current flowing into the short circuit at the end of the transmission line, is represented by

$$I_R = \frac{V_s}{Z_0 \sinh pS}$$

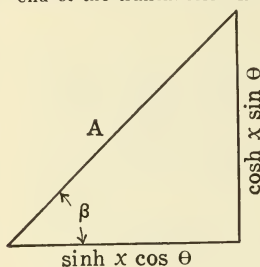
$$\sinh pS = \sinh x \cos \theta + j \cosh x \sin \theta$$

$$= \sinh (x + j\theta) = A \angle \beta$$

where

$$A = \frac{\sinh x \cos \theta}{\cos \beta}$$

and

$$\beta = \cot^{-1} \frac{\tanh x}{\tan \theta}$$


$$I_R = \frac{100 \angle 0^\circ}{723 \angle -11.1^\circ \sinh (25 \times 0.0292 \angle 71.8^\circ)}$$

To 0.0292 on D set 25 on CI.
At 71.8° on S (black) read 0.694 on D.
At 71.8° on S (red) read 0.228 on D.

Consequently,
 $pS = 25 \times 0.0292 \angle 71.8^\circ = 0.228 + j 0.694$ radians

To π on DF set 180 on CF.
At 0.694 on DF read 39.76° on CF.
 $\sinh pS = \sinh (0.228 + j 39.76^\circ)$
 $\theta = 39.76^\circ$ is less than 45° , but greater than 5.75° .
To 0.228 on scale Th set 39.76° on T (black).

Since the slide protrudes to the left, β is greater than 45° and should be read on scale T (red).

After setting indicator to right index of slide, match the indexes of the body and slide.

At indicator read $\beta = 74.92^\circ$ on T (red).

To $x = 0.228$ on scale Sh 1 set $\beta = 74.92^\circ$ on scale S (red).

At $\theta = 39.76^\circ$ on scale S (red) read $A = 0.680$ on scale D.
 $\sinh pS = 0.680 \angle 74.92^\circ$

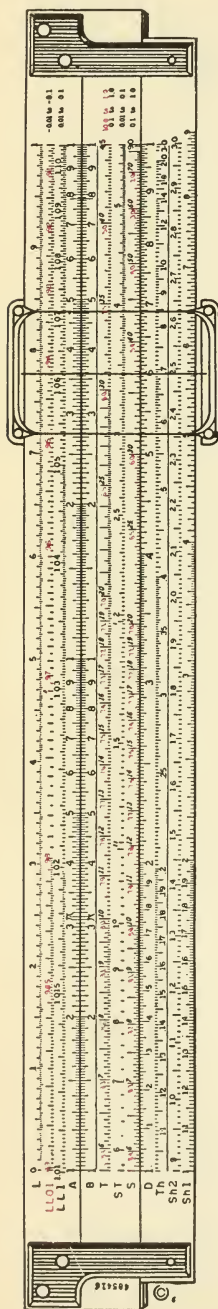
Consequently,

$$I_R = \frac{100 \angle 0^\circ}{723 \angle -11.1^\circ \times 0.680 \angle 74.92^\circ}$$

To right index (100) of D set 723 on C.
At 0.680 on CI read 0.2032 on D.

$I_R = 0.2032 \angle -63.82^\circ$ amperes with respect to the phase of the impressed voltage.

Problems involving complex hyperbolic cosines and hyperbolic tangents can be solved by similar methods. The determination of inverse hyperbolic functions of complex numbers is also greatly facilitated.



No. N4083-3. Back.

KEUFFEL & ESSER CO., NEW YORK

LOG LOG DUPLEX VECTOR SLIDE RULES

REG. U. S. PAT. OFF.

N4083-3. LOG LOG DUPLEX VECTOR Slide Rule, K & E Adjustable, 10 in., engine divided, divisions on white facings, improved Glass Indicator, with Trigonometrical Scales divided to represent degrees and decimals of a degree, in Case, with Directions.

N4083-3S. Same as No. N4083-3 but in sewed Leather Case.

N4083-5. Similar to No. N4083-3 but 20 in.

N4083-5S. Same as No. N4083-5 but in sewed Leather Case.

The LOG LOG DUPLEX VECTOR Slide Rule is like No. N4081, except that the K scale is omitted and three scales of hyperbolic functions are added. These scales Sh1, Sh2, and Th are useful in the solution of a certain class of problems. See page 238 for a problem in hyperbolic vectors solved with these scales.

On one face are the following scales:

LL02 a Log Log scale of range $0.905 (e^{-0.1})$ to $0.368 (e^{-1})$

LL03 a Log Log scale of range $0.368 (e^{-1})$ to $0.00005 (e^{-10})$

DF a full length D scale folded. This arrangement admits of the handling of factors which, in rules without these scales, would frequently require the slide to be reset. Since the constant π is in alignment with the indices of the C and D scales, π can be taken as a factor or divisor in any formula without an additional setting.

CF a full length C scale, folded like the DF scale.

CF a full length inverted folded scale, giving reciprocals of numbers on the CF scale. The inverted scale, in connection with the direct scales, admits of handling three factors with one setting of the slide, or four factors if π is included.

CI a full length C scale inverted.

C a single logarithmic scale.

D a single logarithmic scale like C.

LL3 a Log Log scale of range $2.718 (e^1)$ to $22000 (e^{10})$.

LL2 a Log Log scale of range $1.105 (e^{0.1})$ to $2.718 (e^1)$.

On the reverse face are the following scales:

L a scale of equal parts (decimal exponents of 10).

LL01 a Log Log scale of range $0.99 (e^{-0.01})$ to $0.905 (e^{-0.1})$.

LL1 a Log Log scale of range $1.01 (e^{0.01})$ to $1.105 (e^{0.1})$.

A a two unit logarithmic scale giving directly squares and square roots.

B a two unit logarithmic scale like A.

T a full length scale of Tangents and Cotangents, double numbered, of range $5^{\circ}43'$ or 5.71° to $84^{\circ}17'$ or 84.29° .

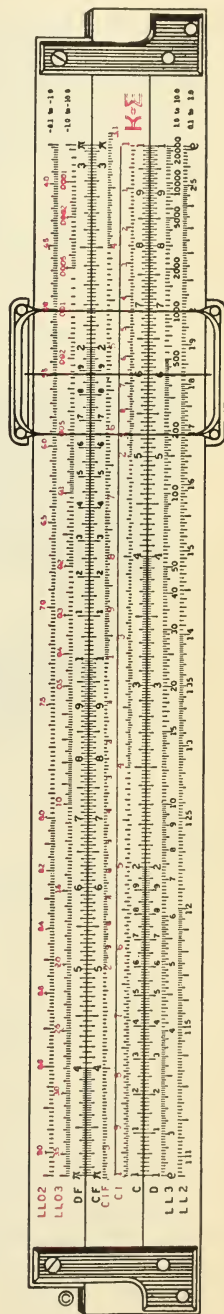
ST a full length scale of Sines and Tangents, of range $0^{\circ}34'$ or 0.57° to $5^{\circ}44'$ or 5.74° .

S a full length scale of Sines and Cosines, double numbered, of range $5^{\circ}44'$ or 5.74° to 90° for Sines, and 0° to $84^{\circ}16'$ or 84.26° for Cosines.

D a single logarithmic scale.

Th a scale of Hyperbolic Tangents.

Sh1, Sh2, a continuous scale of Hyperbolic Sines in two parts.

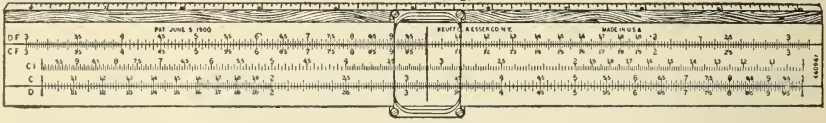


No. N4083-3. Front.



MERCHANTS' SLIDE RULE

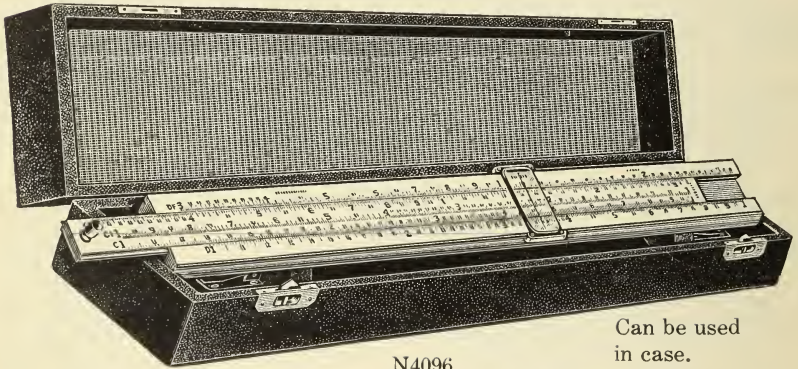
TRADE MARK



Front, showing all scales: DF, CF, CI, C and D.

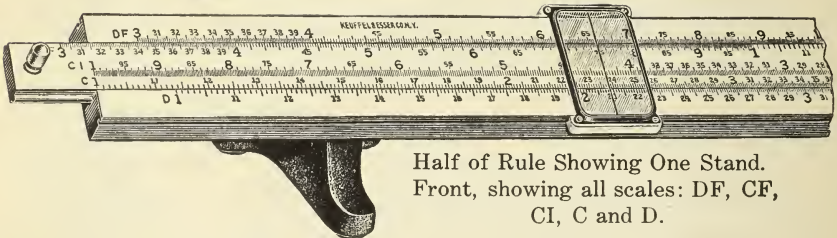
4094. **MERCHANTS' Slide Rule, K & E Adjustable, 10 in.,** engine divided, divisions on white facings, improved Glass Indicator; includes scales in inches and in centimeters. In Case with Directions.

K & E DESK SLIDE RULES



N4096.

Can be used
in case.



Half of Rule Showing One Stand.
Front, showing all scales: DF, CF,
CI, C and D.

- N4096. **Desk Slide Rule, K & E Adjustable, 20 in.,** engine divided, divisions on white facings, improved Glass Indicator; on metal stands; in special Case with Directions.

The K & E Desk Slide Rule is designed specially for the Merchant, Importer, Exporter, Accountant, Manager, Mechanic, Foreman and others whose computations involve only multiplication, division, proportion and percentage.

The selection of scales permits complex problems to be solved with a minimum of manipulation, as fully explained in the instructions. The slide rule is fastened to two metal stands, which keep the face of the rule elevated about 2 inches above the desk and inclined conveniently for easy reading. A knob on the slide enables settings with one hand. Very distinct graduations and large numbers reduce eye strain.

- 4096M. **Desk Slide Rule, like No. N4096, but without stand, knob or special Case;** in Case with Directions.



EVER-THERE SLIDE RULES

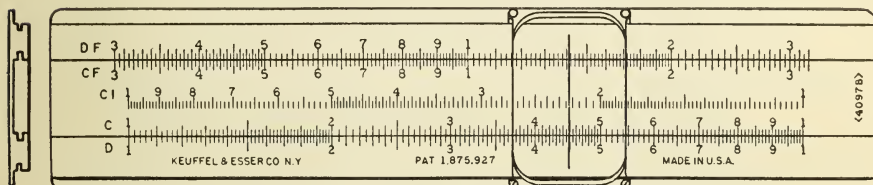
REG. U. S. PAT. OFF.

The **EVER-THERE** Slide Rule is made entirely of white Xylonite, a strong, tough material. On this base the graduations are engine-divided. The handiness of the **EVER-THERE** slide rule is evident from the fact that it weighs no more than a fountain pen, and is much less bulky in the pocket.

The **Ever-There** Slide Rule is pre-eminently a pocket instrument, as the following dimensions will indicate:

Length over all 6 inches.
Thickness $\frac{1}{16}$ inch.
Weight

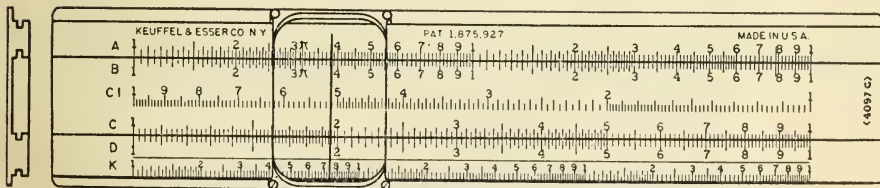
Width over all $1\frac{3}{8}$ inches.
Thickness of Indicator $\frac{1}{16}$ inch.
about $\frac{3}{4}$ ounce.



No. 4097B.

4097B. EVER-THERE Slide Rule, 5 in., white Xylonite, engine divided, improved Glass Indicator, in high-grade leather sheath, with Directions.

The calculating scales of No. 4097B are all upon the front face. The CF and DF are folded scales, the function of which is to enable factors to be taken without resetting, which would be off the rule when using the regular C and D scales. These folded scales correspond in all respects to the C and D scales, except that each has but one index which is located close to the middle of the rule. The CI scale, an inverted C scale, when used in conjunction with the other scales, enables the operator to take three factors at one setting of the slide and to read reciprocals. The back of the rule has a five inch scale divided in inches to 16ths, and a 13 cm. scale divided in centimeters to millimeters.



No. 4097C.

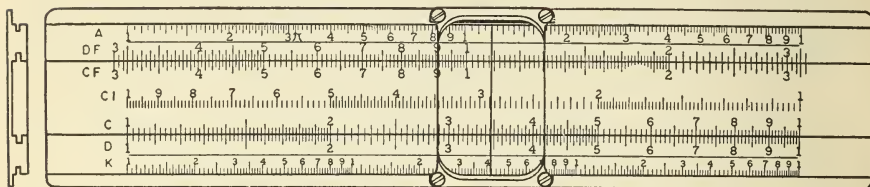
4097C. EVER-THERE Slide Rule, 5 in., white Xylonite, engine divided, improved Glass Indicator, with **Logarithmic and Trigonometrical Scales**; in high-grade leather sheath, with Directions.

The size, form, weight and handiness of the No. 4097C **EVER-THERE** Slide Rule are identical with those of No. 4097B, as described above. The scales are the same as those described under the **POLYPHASE** Slide Rule No. N4053-3, page 232 and are, on the front face, A, B, CI, C, D and K, and on the back of the slide, S, L and T. It has also the inch and centimeter scales as described under No. 4097B above. The slide is reversible.



EVER-THERE SLIDE RULES (Cont.)

REG. U. S. PAT. OFF.

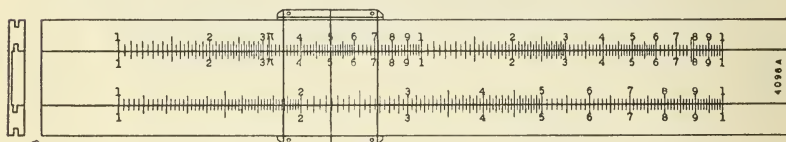


No. 4097D.

4097D. EVER-THERE Slide Rule, 5 in., white Xylonite, engine divided, improved Glass Indicator; with Logarithmic, Trigonometrical and Folded Scales; in high-grade leather sheath, with Directions.

No. 4097D has the same size, form and weight, as Nos. 4097 B and C. On the front face it carries the A, DF, CF, CI, C, D and K scales, and, on the back of the reversible slide, the B, S, L and T scales. It also has the inch and centimeter scales on the back of the rule, as described under No. 4097 B.

K & E POCKET SLIDE RULE



No. 4098A.

4098A. K & E Pocket Slide Rule, 5 in., white Xylonite, "Frameless" transparent Xylonite Indicator, with Mannheim Scales, in leather sheath, with Directions.

The K & E Pocket Slide Rule is made entirely of white Xylonite, a strong, tough material. It weighs less than a fountain pen, and is much less bulky in the pocket. It is pre-eminently a pocket instrument, as the following dimensions will indicate:

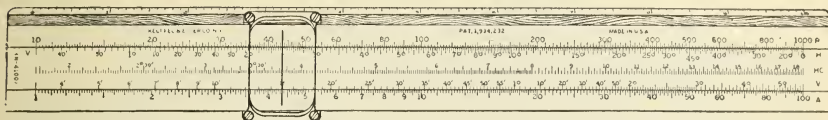
Length over all.....6 inches	Width over all .....1½ inches
Thickness .....¼ inch	Thickness over indicator .....⅜ inch
Weight.....about ½ ounce	

The front face of this rule carries the A, B, C and D scales. The Trigonometric scales S and T, and the Logarithmic Scale L are on the back of the slide, which is not reversible.

The back of the rule has a five inch scale divided in inches to 16ths, and a 13 cm. scale divided in centimeters to millimeters.

KEUFFEL & ESSER CO., NEW YORK

STADIA SLIDE RULES



No. N 4100.

N 4100. K & E STADIA (Mannheim) Slide Rule K & E Adjustable, engine divided, 10 in. divisions on white facings, improved Glass Indicator; in Case.

N 4100S. Same as No. N 4100 but in sewed Leather Case.

N 4101. K & E STADIA Slide Rule like No. N 4100, but 20 in.; in Case.

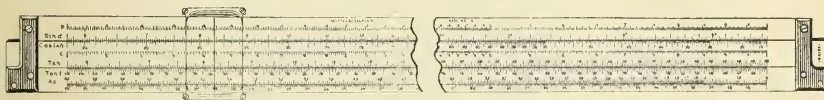
N 4101S. Same as No. N 4101 but in sewed Leather Case.

The very simple Directions are printed on the rule.

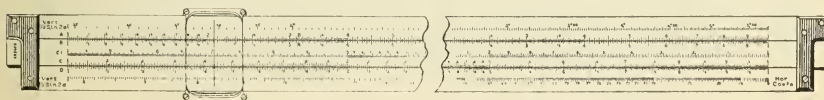
This form of Stadia Slide Rule is remarkable for its simplicity. By one setting of the slide, the horizontal distance and vertical height can be obtained at once, in every case where the Stadia rod reading and vertical angle are known. For the angles commonly encountered in stadia surveying, the values thus found are correct to the nearest $\frac{1}{10}$ of a foot, and sometimes closer. The 20-inch rule naturally gives values which are, in general, more precise than those obtained with the 10-inch rule.

The under side of the slide has a scale corresponding to the lower scale of the rule and resembling the A and B scales of the Mannheim and DUPLEX* rules, so that the rule can be used also for ordinary slide rule computations. One edge is graduated to inches and tenths, to serve as a scale for distances.

SURVEYOR'S DUPLEX REG. U. S. PAT. OFF. SLIDE RULE



Front



Back

No. N 4102

N 4102. SURVEYORS' DUPLEX Slide Rule, K & E Adjustable 20 in., engine divided, divisions on white facings, improved Glass Indicator; in Case, with Directions.

N 4102S. Same as No. N 4102 but in sewed Leather Case.

All astronomical data essential to surveying, such as azimuth, time, latitude, etc., can be ascertained by means of the usual type of Transit with vertical circle but without solar attachment. While the observations may be made with great rapidity, the computations are tedious and require a great deal of time.

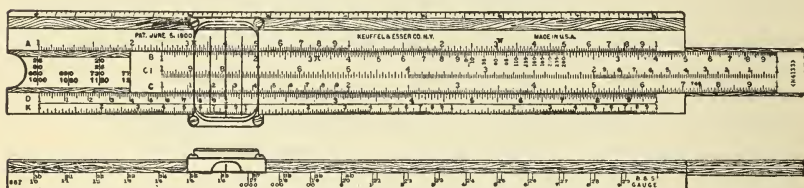
The K & E Surveyors' Slide Rule entirely eliminates this difficulty by reducing the hitherto complicated calculations to mere mechanical operations, thereby rendering the method of field astronomy with the regular Engineer's Transit extremely simple and practical.

One face is arranged for the determination of the meridian by direct solar observations; it also carries the sine and cosine scales used in computing the latitudes and departures of the course.

The other face has the usual scales A, B, C, and D, for all general numerical calculating, as well as two full length stadia scales for computing horizontal distances and vertical heights.



ROYLANCE ELECTRICIANS' SLIDE RULE



No. N4133S.

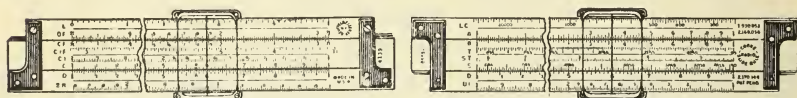
N4133 ROYLANCE ELECTRICIANS' (Mannheim) Slide Rule, K & E Adjustable, 8 in..
engine divided, divisions on white facings, improved Glass Indicator;
in Case, with directions.

N4133S. Same as No. N4133, but in sewed Leather Case.

The Roylance Electricians' Slide Rule is a modification of the regular K & E POLYPHASE Slide Rule and can be used for all the calculations made with the ordinary Slide Rule. In addition to the usual POLYPHASE scales it carries a series of scales or gauge marks by means of which the different properties of copper wire, such as size, conductivity, weight, etc., may be determined without the use of tables.

Other features embodied in the rule are the extra hair lines on the Indicator for the calculation of circular areas, the special gauge mark (746) for the conversion of Horse-power and Kilowatts, and a special set of figures giving the temperature of wire in degrees Centigrade corresponding to resistance in ohms per 1000 feet.

COOKE RADIO SLIDE RULE



Front

Back

4139. COOKE RADIO Slide Rule, K & E Adjustable, engine divided, 10 in. divisions
on white facings, Improved Glass Indicator; in Case, with Directions.

4139S. COOKE RADIO Slide Rule. Same as No. 4139 but in sewed Leather Case.

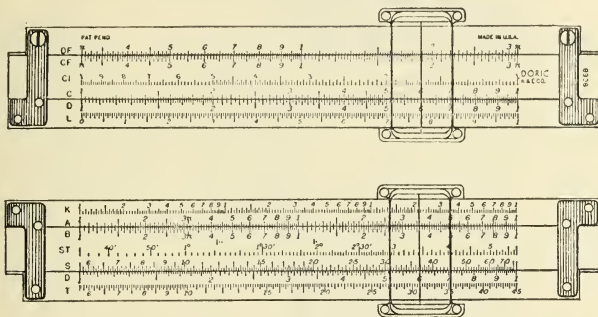
Designed to facilitate the rapid solution of radio engineering problems as well as for general use, this slide rule is like the POLYPHASE DUPLEX DECITRIG slide rule (No. 4071-3) except that the K scale is omitted, the position of the L scale is changed and two special scales, 2π , and LC have been added.

The 2π scale is a single unit logarithmic, "folded" at the value of 2π , which is conveniently used in a wide variety of problems involving inductance, capacity, reactance, etc. The LC scale provides a rapid method of determining the resonant frequency for any given combination of inductance and capacity, and for the solution of similar problems involving resonance.

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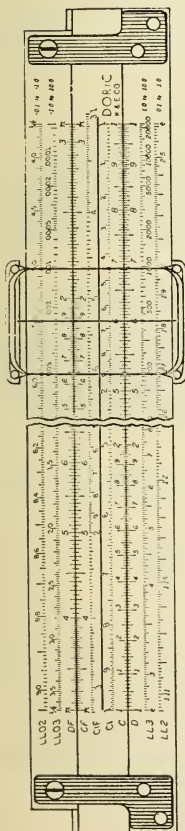
DORIC SLIDE RULES

TRADE MARK



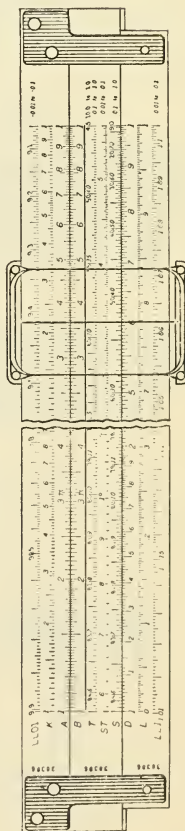
No. 9068.

9068. DORIC Plastic Slide Rule, K & E Adjustable. 5 in., improved indicator; with Trigonometrical Scales divided to represent degrees and minutes: on one face are the DF, CF, CI, C, D, and L scales; on the other face are the K, A, B, ST, S, D and T scales; in leather sheath, with Directions.



No. N9081-3
Front

N9081-3. DORIC Plastic Slide Rule, K & E Adjustable. 10 in., with scale arrangement as on K & E No. N4081-3 (Trigonometrical Scales divided to represent degrees and decimals of a degree) and including the "legends" or range numbers. On one face are the LLO2, LLO3, DF, CF, CIF, CI, C, D, LL3 and LL2 scales; on the other face are the LLO1, K, A, B, T, ST, S, D, L and LL1 scales. Numbers, which are all black, slant backward or forward in the direction of increasing scale values; improved indicator; in case, with Directions.

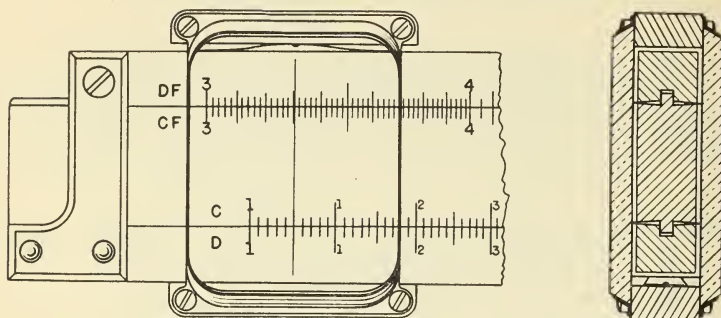


No. N9081-3
Back

N9081-1. DORIC Plastic Slide Rule, K & E Adjustable. 5 in., with improved indicator and scale arrangement as on N9081-3, in leather sheath, with Directions

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K & E IMPROVED GLASS INDICATOR

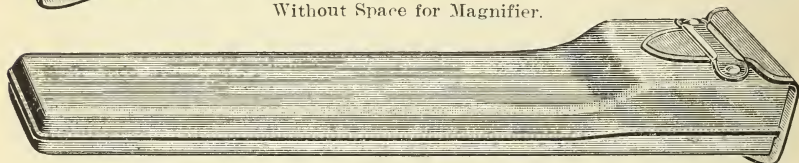


The K & E Improved Glass Indicator has a glass which is surrounded and protected by a frame formed from one piece of metal. This metal frame has flanges through which the screws pass to hold the glass to the ends or sliding pieces of the indicator. The frame surrounding the glass does not overlap its face; hence, every number on the rule is visible at all times. Consequently, the improved indicator offers the chief advantage of the "Frameless" indicator—i.e. visibility—and, in addition, a much greater insurance against damage to the glass.

SEWED LEATHER CASES FOR SLIDE RULES



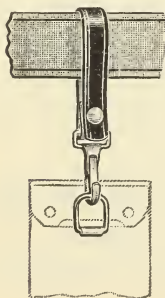
Without Space for Magnifier.



With Space for Magnifier.

Sewed leather cases are made of the best top-grain cowhide, hand sewed; and are lined with real chamouis. The loop on the case through which the tongue passes has friction springs. These springs insure that the flap will not open accidentally.

BELT CARRIER FOR K & E SLIDE RULE CASES



A leather loop with snaphook and ring, to attach a slide rule case to the belt for convenient carrying. The Belt Carrier can be used with all K & E sewed leather slide rule cases and with K & E plain slide rule cases as now made with the reinforcing plate where the flap is joined to the case.

4183. Belt Carrier, leather.

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K & E SLIDE RULE INDICATORS, GLASSES, MAGNIFIERS AND CASES

Cat. No. of Slide Rule	Indicator No.	Glass No.		Magnifier No.	†Sewed Leather Case No.	Cat. No. of Slide Rule	Indicator No.	Glass No.		Magnifier No.	†Sewed Leather Case No.
		Improved	"Frameless"					Improved	"Frameless"		
4031 S	A	.....	1	.....	O	4090-3 (&-3S)	} IL	} 7L	} *	4185 C	} X
4035 S	B	.....	2	.....	P	4091-3 (&-3S)				4185 C	
N 4035 S	EL	4L	*	4185 B	P	4092-3 (&-3S)	IL	7L	*	4185 C	X
4041 (&-F)	D	.....	3	4185 B	R	4092-5 (&-5S)	IL	7L	*	4185 C	Z
N 4041 (&-S)	EL	4L	*	4185 B	R	N 4092-5 (&-5S)	laL	7L	*	4185 C	Z
N 4041 F (&-FS)	EL	4L	*	4185 B	R	4093-3 (&-3S)	IL	7L	*	4185 C	X
4045 (&-S)	EL	4L	*	4185 B	S	4093-5 (&-5S)	laL	7L	*	4185 C	Z
4051 (&-S)	EL	4L	*	4185 B	T	4094	EL	4L	*	4185 B	R
4053-2S	FL	4L	*	4185 B	P	4095	H	.....	5	4185 B	W
N 4053-2S	EL	4L	*	4185 B	P	4095-1S	K	.....	8	.....	U†
4053-3 (&-3F)	FL	4L	*	4185 B	R	4095-3 (&-3S)	GL	6L	*	4185 B	W
N 4053-3 (&-3F)	EL	4L	*	4185 B	R	4095-5 (&-5S)	IL	7L	*	4185 C	Z
4053-3S (&-3FS)	FL	4L	*	4185 B	R	4096	EL	4L	*	4185 B	.....
N 4053-3S (&-3FS)	EL	4L	*	4185 B	R	N 4096	JL	7L	*	4185 C	.....
4053-5 (&-5S)	FL	4L	*	4185 B	T	4096 M	JL	7L	*	4185 C	.....
N 4053-5 (&-5S)	EL	4L	*	4185 B	T	4097	N2	.....	.....	AA†	.....
4054	EL	4L	*	4185 B	.....	4097 B, C, D	N2	.....	.....	AA†	.....
4055	EL	4L	*	4185 B	.....	4098	N2	.....	.....	AA†	.....
4056	M5	.....	.....	.....	.....	4098 A	N3	.....	.....	BB†	.....
4058 W	M5	.....	.....	.....	.....	4100 (&-S)	D	.....	3	4185 B	R
N 4058 W	M5	.....	.....	.....	.....	N 4100 (&-S)	EL	4L	*	4185 B	R
4070-3 (&-3S)	} PL	} 9L	}	} 4185 D	} W	4101 (&-S)	} EL	} 4L	} *	} 4185 B	} T
4071-3 (&-3S)						N 4101 (&-S)					
4080-3 (&-3S)	} IL	} 7L	}	} 4185 C	} X	4102 (&-S)	IL	7L	*	4185 C	Z
N 4080-3 (&-3S)						N 4102 (&-S)	laL	7L	*	4185 C	Z
4081-3 (&-3S)						4128 (&-S)	IL	7L	*	4185 C	Z
N 4081-3 (&-3S)						4133 S	C	.....	2a	.....	P
4080-5 (&-5S)	} laL	} 7L	}	} 4185 C	} Z	N 4133 S	FaL	4aL	*	4185 B	P
N 4080-5 (&-5S)						N 4135 S	K	.....	8	.....	U†
4081-5 (&-5S)						4138 (&-S)	IL	7L	.....	4185 C	X
N 4081-5 (&-5S)						4139 (&-S)	PL	9L	.....	4185 D	W
4083-3 (&-3S)	} IL	} 7L	}	} 4185 C	} X	4142 (&-S)	IL	7L	*	4185 C	X
N 4083-3 (&-3S)						4160 (&-S)	IL	7L	*	4185 C	Z
4083-5 (&-5S)	} laL	} 7L	}	} 4185 C	} Z	4165	EL	4L	*	4185 B	R
N 4083-5 (&-5S)						4166	laL	7L	*	4185 C	Z
4088-1S	K	.....	8	.....	U†	4175	JL	7L	.....	4185 C	.....
4088-2S	GL	6L	*	4185 B	V	9068	TL	10L	.....	CC†	.....
4088-3 (&-3S)	GL	6L	*	4185 B	W	9071-3	SL	9L	.....	.....	.....
4088-5 (&-5S)	IL	7L	*	4185 C	Z	N 9081-3	RL	7L	.....	.....	.....
N 4088-5 (&-5S)	laL	7L	*	4185 C	Z	10000	TL	10L	.....	CC†	.....

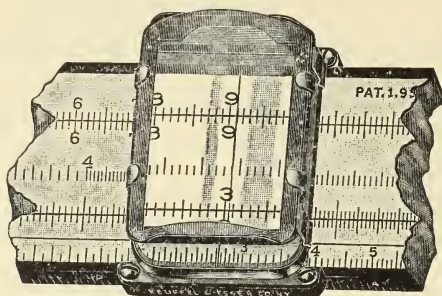
* To replace a broken "Frameless" glass, substitute the corresponding complete Improved Indicator.

† Whenever an empty sewed leather case with space for magnifier is desired, add the letter "M" to the letter in the column headed "Sewed Leather Case No.", as "OM", "PM", "TM" etc.

‡ Sewed leather sheath.

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MAGNIFIERS FOR SLIDE RULES



No. 4185 B.

The Magnifiers are mounted in a metal frame and are applied to the rule by springing them on the glass indicator. The lens is thus always in position for reading and is always in focus. The magnification is ample for even the finest graduations, the field covers the full area of the indicator, and the lines do not appear distorted. These Magnifiers cannot be used on glass indicators with two hairlines.

When ordering please indicate kind of slide rule for which the magnifier is wanted. See Table. Page 247.

4185 B. Magnifier for Slide Rules.

4185 C. Magnifier for Slide Rules.

4185 D. Magnifier for Slide Rules.

BOOKS ON THE SLIDE RULE

The following are Self-Teaching Manuals, with Tables of Settings, Equivalent and Gauge Points; prepared by competent authorities, and applying specifically to K & E Slide Rules:

4187 G. "The Mannheim Slide Rule" (No. 4056).

4187 H. "The Polyphase Slide Rule" (Nos. N4053 & 4054).

4187 R. "The Log Log Duplex Trig Slide Rule" (No. 4080).

N4187R. "The Log Log Duplex Trig Slide Rule" (No. N4080).

4187 S. "The Log Log Duplex Decitrig Slide Rule" (No. 4081).

N4187S. "The Log Log Duplex Decitrig Slide Rule" (No. N4081). (Also for use with Doric Slide Rule No. N9081-3)

4187 T. "The Polyphase Duplex Trig Slide Rule" (No. 4070).

4187 U. "The Polyphase Duplex Decitrig Slide Rule" (No. 4071). (Also for use with Doric Slide Rule No. 9071-3).

4187 V. "The Log Log Duplex Vector Slide Rule" (No. 4083).

N4187V. "The Log Log Duplex Vector Slide Rule" (No. N4083).

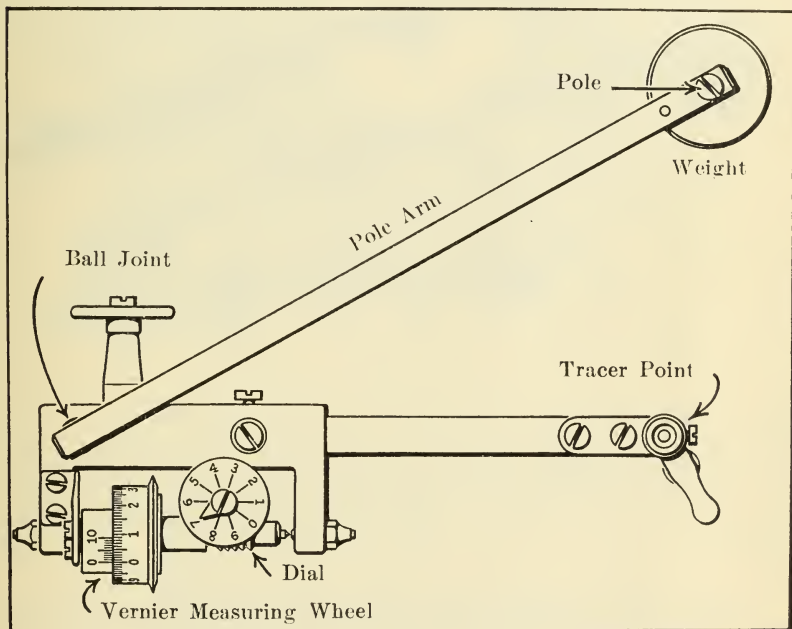
4187 W. "The Cooke Radio Slide Rule" (No. 4139).

4187 X. "The Doric Slide Rule" (No. 9068).

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PLANIMETERS

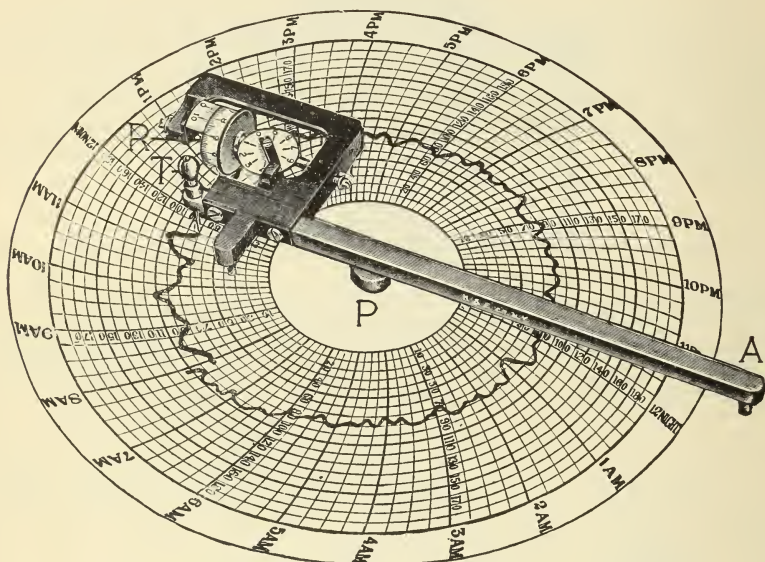
The planimeter, invented in 1854 by Professor Jacob Amsler of Switzerland, is an ingenious mechanical device for measuring the areas of plane surfaces. While used primarily by engineers to secure, rapidly and accurately, the content of such irregular areas as occur on maps, profiles, indicator diagrams, etc., the value of the planimeter in connection with all sorts of graphical analyses and studies is now being recognized and is leading to its more extended use as a labor and time saving instrument.



Radial Planimeter (No. 4215) is used exclusively for the purpose of measuring the mean height of the trace on circular charts. Compensating Polar Planimeters with fixed arms (Nos. 4236 and 4236M) and Rolling Disc-Planimeter (No. 4262) are used for finding areas in square inches and square centimeters or, with the aid of a simple computation, in any desired unit of area. Compensating Polar Planimeter with adjustable tracer and pole arms (No. 4242) is used for finding areas directly on drawings or maps to any scale. These instruments are described in detail in the pages following.

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RADIAL PLANIMETER



4215. Radial Planimeter. in case, with pin extractor and directions.

The Radial Planimeter furnishes a rapid, accurate method of measuring mean heights of circular diagrams with uniformly spaced ordinates. It covers a circle 1 to 13½ inches in diameter, thus embracing the range of the usual disc diagrams.

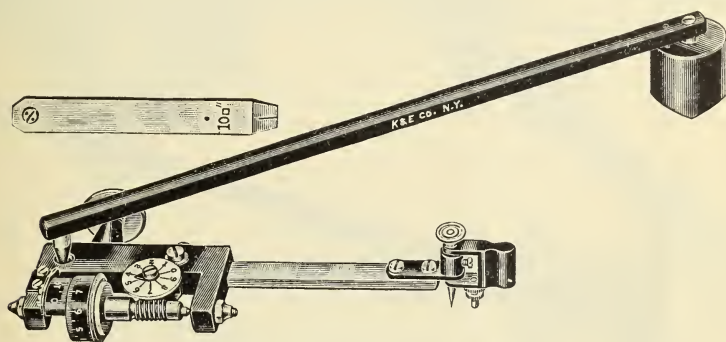
Center pin P is pressed into the drawing board over the center of the diagram. The Planimeter is then mounted with the head of the center pin in the groove of the tracer arm. By this means a compulsory working of the planimeter with reference to the center of the diagram is secured. The tracer point is now brought to the starting point of the diagram and the reading of the instrument is taken. The diagram is traced clockwise until the tracer point returns to the starting point, when a second reading is taken. The difference between these readings, multiplied by the constant 0.0004, minus the radius of the base circle, gives the mean height or mean ordinate of the diagram in inches.

The illustration shows the dial, wheel and vernier black on white for clarity. On the instrument graduations and numbers are white on black.

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K & E COMPENSATING POLAR PLANIMETERS WITH FIXED ARMS

These planimeters, requiring no setting or adjustment, are easy to operate and measure areas with accuracy and speed. Although they measure areas only in square inches (No. 4236) or square centimeters (No. 4236M) they may be used on drawings or maps to any scale to give the area in the desired unit square feet, acres, etc.) by multiplying the result by a factor. Complete simple instructions are included in the manual supplied with each instrument.



No. 4236.

- 4236.** Compensating Polar Planimeter, reading areas directly in square inches to 0.01 sq. in.; vernier, measuring wheel and dial graduated in white on a black background; with testing rule; in velvet lined case; with complete instructions.

Length of tracer arm, $4\frac{1}{8}$ in.

Length of pole arm, $7\frac{1}{2}$ in.

Maximum area, "pole-outside-figure", rectangle $14\frac{1}{2} \times 5\frac{1}{2}$ in. or square $7\frac{1}{2} \times 7\frac{1}{2}$ in.

Maximum area, "pole-within-figure", circle 23 in. diameter, or square 16×16 in.

- 4236M.** Compensating Polar Planimeter, reading areas directly in square centimeters to 0.1 sq. cm.; vernier, measuring wheel and dial graduated in white on a black background; with testing rule; in velvet lined case; with complete directions.

Length of tracer arm, $6\frac{3}{8}$ in. (16.2 cm.)

Length of pole arm, $7\frac{1}{2}$ in. (19.1 cm.)

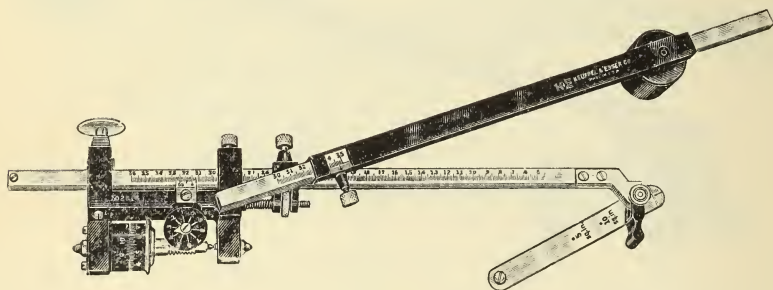
Maximum area, "pole-outside-figure", rectangle 48×22 cm., or square 27×27 cm.

Maximum area, "pole-within-figure", circle 70 cm. diameter, or square 49×49 cm.

KEUFFEL & ESSER CO., NEW YORK

K & E COMPENSATING POLAR PLANIMETER WITH ADJUSTABLE ARMS

This planimeter has a wide range of usefulness, as a result of its adjustable arms. Areas can be accurately measured, ranging from a fraction of a square inch up to almost the entire area of the average drawing board. By setting the arms to predetermined positions, areas to scale may be read directly. The manual supplied with each instrument gives easily understood instructions for settings to any scale, and all information necessary to proper operation and care.



No. 4242.

4242. Compensating Polar Planimeter, adjustable tracer arm with vernier and adjustable pole arm; for reading areas in square inches to 0.01 sq. in. or square centimeters to 0.04 sq. cm. or other units to scale; with testing rule; in velvet case; with complete instructions.

Range of tracer arm length, $1\frac{1}{2}$ to 7 in.

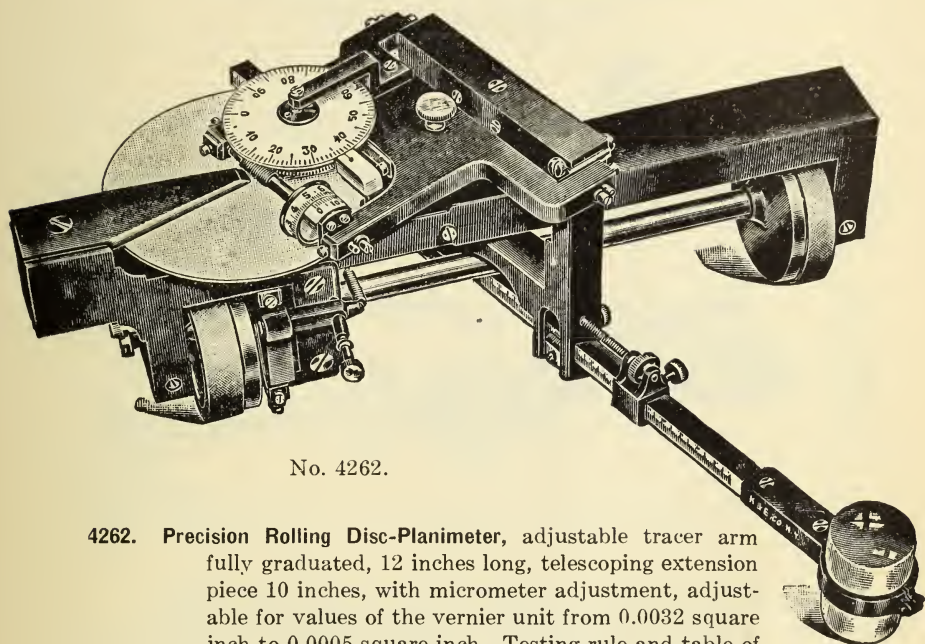
Range of pole arm length, 6 to 13 in.

Maximum area, "pole-outside-figure", circle $12\frac{3}{4}$ in. diameter, square 12×12 in.

Maximum area, "pole-within-figure", circle 39 in. diameter, square $27\frac{1}{2} \times 27\frac{1}{2}$ in.

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ROLLING PLANIMETER



No. 4262.

4262. Precision Rolling Disc-Planimeter, adjustable tracer arm fully graduated, 12 inches long, telescoping extension piece 10 inches, with micrometer adjustment, adjustable for values of the vernier unit from 0.0032 square inch to 0.0005 square inch. Testing rule and table of settings for the English System; in morocco finish case, with lock and key; with directions. Least reading, .0005 of a square inch.

The **Rolling Disc-Planimeter** is a combination of the rolling sphere planimeter and the disc polar planimeter; the integration parts (sphere and cylinder) are replaced by somewhat less intricate parts (disc and roller). The maximum area that can be measured in one operation with the rolling disc planimeter is a rectangle of any desired length, width not exceeding the length of the extended tracer arm.

The above illustration represents the instrument about $\frac{1}{3}$ actual size. The distance between the two rollers is 17 cm ($6\frac{3}{4}$ "), so that diagrams of indicators (Wattmeters, steam-gauges etc.) up to a width of 17 cm ($6\frac{3}{4}$ ") and any desired length can be measured without the rollers touching the paper. The aluminum disc, which is covered with paper, is fixed on a vertical axis, which can be easily turned between two pivots; the small toothed wheel on the axis engages automatically, i. e. elastically, in the gearing of the measuring roller, so that no obstruction or deviation from the rectilinear travelling of the running roller is caused owing to dust or other extraneous matter which may get in between the gearing. The measuring roller and its frame are similar to those of the disc polar planimeter; the gear wheel indicates up to 100 revolutions of the measuring roller. The tracer arm, its graduation, length and arrangement, and the values of the vernier units of the measuring roller are the same as in the rolling sphere planimeter. The handling is exactly the same as for that instrument.

Maximum Area Covered	{	Square, $19\frac{3}{4}$ in. side.
		Circle, $19\frac{3}{4}$ in. dia.
		Rectangle, $19\frac{3}{4}$ in. \times unlimited length.

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AMSLER'S MECHANICAL INTEGRATORS

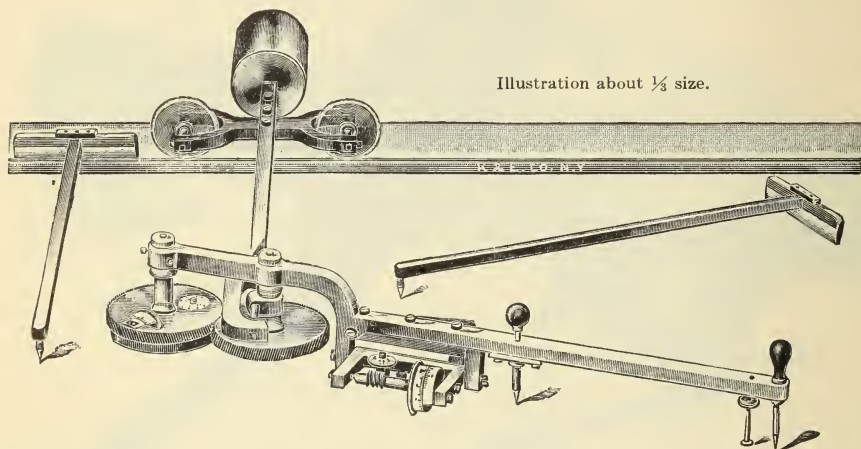


Illustration about $\frac{1}{4}$ size.

No. 4270.

- *4270. Amsler's Integrator, nickel silver, with two recording mechanisms giving the area and moment of any figure; two tracing points, two gauges for adjusting instrument to axis of moments; grooved steel rail 29 inches; in hardwood case, with directions.**

Integrator No. 4270 gives the area and moment of any figure by a simple mechanical operation. It is provided with two tracing points, for large and small figures. The one nearest to the center of rotation of the instrument effects a greater travel of the measuring wheel, consequently the area value of the wheel unit is smaller and the result more accurate. Large figures can be measured in sections. Area and moment of figures drawn to scale can be easily obtained by means of a formula furnished with each instrument.

The range of the instrument is:

Longitudinal	26 in.
Transverse	15 in.

Grooved steel rails of other lengths furnished to order.

- *4280. Amsler's Integrator, nickel silver, with three recording mechanisms giving the area, moment, and moment of inertia of any figure; two tracing points, two gauges for adjusting instrument to axis of moments; instrument in hardwood case. Grooved steel rail 59 in., in separate hardwood case. With directions.**

Integrator No. 4280 is provided with a third train of recording wheels, which renders the moment of inertia of the figure measured.

The range of the instrument is:

Longitudinal	50 in.
Transverse	13 in.

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